

# SEQUENCE LISTING

<110> Courtney, Harry

<120> Streptococcal Serum Opacity Factors And Fibronectin-Binding Proteins And Peptides Thereof For The Treatment And Detection of Streptococcal Infection

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<170> FastSEQ for Windows Version 4.0

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cttttnntc cctggcaatt tcctaattna ncccaaacac caggatatcc ctaccnttca      180
acttcccaaa aagatgaaga ncctggagat tagtggaggt catggaccg attgtcgata      240
tcgtcgaaga tactggtaca ggtggtgagg gcggcgctca aaacggcggtg gtttcaactc      300
aggaaaataa agatccaatc gttgacatca cggaagatac ccaaccaggt atgtcaggct      360
ctaatacgc aacagttgtc gaggaagaca caacaccta acgtccagat gttcttggtg      420
gtggtcaaag tgatccaatc gacatcactg aagacacca accaagtgtg tcaggctcta      480
atgacgtac tgttatcgaa gaagatacga aaccaaacg cttcttcac tttgataacg      540
agccacaagc accagaaaaa cctaaagagc aaccatctcn acaagatagt aacagcttac      600
cacaagctcc agcctataag gcagctcatc acttgcctgc atctggagac aaacgtgaag      660
tatactttac aattgctgct ctaacaatta ttggagctgc aggtttgctc agcaaaaaac      720
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gttactagtg gatccgagct ngg                                         803
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<210> 5  
<211> 1026  
<212> PRT  
<213> Streptococcus pyogenes

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Ser Ala Ser Ser Ser Thr Glu Ser Ser Thr Thr Thr Ala Asn Thr Gly
          35          40          45
Thr Gly Thr Ala Ser Gly Met Thr Ala Thr Thr Pro Ser Ala Thr Thr
          50          55          60
Asp Thr Gly Glu Ala Ala Gly Ser Gly Ala Arg Ser Glu Ala Asn Gly
65          70          75          80
Ala Ser Ser Val Val Ser Ser Glu Glu Ser Gln Ser Ser Gly Thr Thr
          85          90          95
Pro Ala Ser Pro Gln Ala Gln Thr Ala Pro Ala Ala Thr Ser Thr Ser
          100          105          110
Ser Val Ser Ser Ser Asn Glu Lys Thr Pro Lys Thr Ala Thr Thr Thr
          115          120          125
Thr Ser Ser Thr Pro Val Ala Ser Thr Ser Asn Asn Ser Asn Lys Val
          130          135          140
Thr Ser Thr Glu Ala Glu Thr Gln Thr Val Asp Val Glu Arg Tyr Thr
145          150          155          160
Val Asp Lys Glu Asn Ser Lys Leu Asn Ile Lys Asp Gly Lys Thr Pro
          165          170          175
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Lys	Thr	Arg	Ser	Ser	Val	Asn	Lys	Asp	Thr	Lys	Leu	Ile	Arg	Asn	Arg	
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Asp	Asp	Lys	Gln	Arg	Asp	Ile	Val	Asp	Val	Thr	Arg	Thr	Val	Glu	Thr	
		195					200					205				
Asn	Glu	Asp	Gly	Leu	Leu	Met	Phe	Thr	Gly	Asn	Gly	Leu	Lys	Pro	Lys	
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Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Gln	
225					230					235					240	
Lys	Met	Thr	Lys	Glu	Asn	Phe	Asp	Lys	Ala	Lys	Glu	Gln	Ile	Lys	Lys	
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Met	Val	Thr	Thr	Leu	Thr	Gly	Glu	Pro	Thr	Asp	Gly	Lys	Glu	Asn	His	
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Glu	Pro	Ile	Glu	Leu	Thr	Ala	Glu	Asn	Val	Asp	Lys	Thr	Leu	Asp	Glu	
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Val	Trp	Lys	Lys	Ala	Lys	Glu	Asp	Trp	Asp	Trp	Gly	Val	Asp	Leu	Gln	
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Gly	Ala	Ile	His	Lys	Ala	Arg	Glu	Ile	Phe	Asn	Lys	Glu	Lys	Glu	Lys	
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Lys	Ser	Gly	Lys	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	
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Thr	Phe	Ser	Tyr	Asp	Ile	Lys	Asn	Lys	Met	Ile	Leu	Gln	Lys	Leu	Pro	
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Ile	Thr	Glu	Lys	Val	Thr	Thr	Ser	Ser	Pro	Leu	Phe	Pro	Trp	Leu	Pro	
	370					375					380					
Ile	Phe	Asn	His	Thr	Asn	Arg	Lys	Ala	Glu	Ile	Ile	Gly	Asp	Leu	Glu	
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Lys	Val	Leu	Asp	Met	Ala	Glu	Lys	Val	Gly	Ile	Ser	Leu	Pro	Ser	Ser	
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Leu	Lys	Ser	Ala	Val	Lys	Val	Leu	Gly	Leu	Thr	Asn	Ser	Ala	Ile	Gly	
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Ser	Ile	Leu	Gly	Lys	Gly	Leu	Thr	Glu	Tyr	Leu	Gly	Leu	Thr	Glu	Tyr	
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Ser	Ser	Asp	Asn	Leu	Asp	Gly	Gly	Gly	Phe	Asp	Tyr	Ser	Lys	Arg	Val	
	450					455					460					
Gly	Glu	Gly	Tyr	Tyr	Tyr	His	Ser	Leu	Ser	Asp	Arg	Lys	Tyr	Glu	Asn	
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Thr	Met	Pro	Leu	Glu	Glu	Ala	Ile	Arg	Thr	Ala	Leu	Ala	Ser	Asn	Phe	
				485					490					495		
Pro	Lys	Leu	Thr	Asp	Asn	Trp	Phe	Phe	Asp	Ile	Leu	Asn	Ser	Phe	Val	
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Ser	Glu	Gly	Asn	Asn	Phe	Leu	Ser	Asn	Val	Glu	Glu	Arg	Asp	Phe	Phe	
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<213> Streptococcus pyogenes

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 <213> Streptococcus pyogenes

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 35 40 45  
 Glu Ala Thr Pro Gln Pro Gln Ala Gln Ile Ala Pro Val Ala Ala Ala  
 50 55 60  
 Thr Ser Thr Ser Ser Ala Ser Ser Ser Ser Asp Gly Lys Ala Pro Gln  
 65 70 75 80  
 Ala Val Thr Ser Ser Thr Ser Pro Ser Thr Pro Ala Ala Ala Ser Ser  
 85 90 95  
 Asn Gly Ser Asn Gln Glu Ala Ser Ala Glu Thr Glu Pro Gln Thr Met  
 100 105 110  
 Glu Val Glu Lys Tyr Thr Val Asp Lys Glu Asn Ser Lys Leu Asn Ile  
 115 120 125  
 Lys Asp Gly Lys Thr Pro Lys Thr Gly Ser Ser Val Asn Asn Glu Lys  
 130 135 140  
 Asp Thr Lys Leu Ile Arg Asn Arg Asp Gly Lys Leu Arg Asp Ile Val  
 145 150 155 160  
 Asp Val Thr Arg Thr Val Lys Thr Asn Glu Asp Gly Thr Ile Asp Val  
 165 170 175  
 Thr Val Thr Val Lys Pro Lys Gln Ile Asp Glu Gly Ala Asp Val Met  
 180 185 190  
 Ala Leu Leu Asp Val Ser Lys Lys Met Ser Glu Asp Asp Phe Asn Asn  
 195 200 205  
 Ala Lys Asn Lys Ile Lys Lys Leu Val Lys Thr Leu Thr Ser Lys Ser  
 210 215 220  
 Ala Ser Asn Ser Asp Asn Asp Glu His Lys Tyr Asn Ser Arg Asn Ser  
 225 230 235 240  
 Val Arg Leu Met Thr Phe Tyr Arg Glu Ile Ser Asn Pro Ile Asp Ile  
 245 250 255  
 Ser Gly Lys Thr Glu Glu Gln Leu Asp Lys Leu Leu Asp Asp Leu Arg  
 260 265 270  
 Lys Lys Ala Lys Ala Asn Tyr Asp Trp Gly Val Asp Leu Gln Gly Ala  
 275 280 285  
 Ile His Lys Ala Arg Glu Ile Phe Asn Lys Glu Lys Glu Lys Lys Phe  
 290 295 300  
 Gly Lys Arg Arg His Ile Val Leu Phe Ser Gln Gly Glu Ser Thr Phe  
 305 310 315 320  
 Ser Tyr Glu Leu Gln Asn Ser Val Arg Glu Asp Lys Thr Lys Leu Ser  
 325 330 335  
 Arg Leu Ser Gly Ala Val Thr Ser Ser Asn Pro Leu Leu Pro Trp Pro  
 340 345 350  
 Pro Ile Phe Asn His Thr His Lys Asn Ile Asp Met Leu Asp Asp Val  
 355 360 365  
 Lys Asn Leu Val Lys Leu Gly Gln Thr Leu Gly Ile Ala Gly Leu Asp  
 370 375 380  
 Asn Leu Gln Ser Thr Leu Ser Leu Ile Ser Thr Gly Ser Ser Leu Ala  
 385 390 395 400

Gly	Ala	Phe	Leu	Gly	Gly	Gly	Ser	Leu	Thr	Glu	Tyr	Leu	Thr	Leu	Lys	405	410	415
Glu	Tyr	Lys	Ser	Gly	Asp	Leu	Lys	Glu	Asn	Gln	Phe	Asp	Tyr	Thr	Lys	420	425	430
Arg	Val	Gly	Glu	Gly	Tyr	His	Phe	His	Ser	Phe	Ser	Glu	Arg	Lys	Lys	435	440	445
Thr	Gly	Glu	Ile	Pro	Phe	Lys	Ser	Glu	Ile	Glu	Pro	Lys	Ile	Lys	Glu	450	455	460
Leu	Phe	Glu	Asn	Asn	Lys	Asn	Asn	Gln	Asp	Lys	Ser	Trp	Thr	Glu	Trp	465	470	475
Ile	Phe	Asp	Lys	Leu	Ser	Leu	Thr	Glu	Arg	Ile	Gln	Lys	Ala	Lys	Gln	485	490	495
Glu	Thr	Leu	Met	Lys	Leu	Leu	Glu	Tyr	Leu	Phe	Tyr	Lys	Arg	Glu	Tyr	500	505	510
His	Tyr	Tyr	Asn	His	Asn	Leu	Ser	Ala	Ile	Ala	Glu	Ala	Lys	Met	Ala	515	520	525
Gln	Gln	Glu	Gly	Ile	Thr	Phe	Tyr	Ser	Val	Asp	Val	Thr	Asp	Leu	Lys	530	535	540
Thr	Thr	Ser	Lys	Arg	Val	Lys	Arg	Gln	Val	Glu	Ser	Thr	Glu	Asp	Lys	545	550	555
Lys	Lys	Glu	Lys	Asp	Arg	Glu	Asp	Ile	Glu	Lys	Glu	Arg	Asn	Glu	Lys	565	570	575
Phe	Asp	Asn	Tyr	Leu	Lys	Gln	Met	Ser	Glu	Gly	Gly	Lys	Asp	Phe	Phe	580	585	590
Glu	Asp	Val	Asp	Lys	Ala	Glu	Lys	Phe	Lys	Asp	Ile	Leu	Thr	Asn	Val	595	600	605
Thr	Val	Thr	Glu	Thr	Phe	Glu	Asp	Gly	Val	Asn	Val	Lys	Asp	Asn	Ser	610	615	620
Trp	Gln	Val	Ser	Ser	Glu	Asn	Asn	Asn	Ser	Leu	His	Ser	Asn	Tyr	Lys	625	630	635
Ser	Val	Thr	His	Lys	Ala	Ala	Ser	Asp	Ala	Ser	Trp	Trp	Ser	Leu	Tyr	645	650	655
Ser	Asn	Lys	Glu	Ser	Leu	Thr	Trp	Thr	Ile	Ser	Lys	Glu	Gln	Leu	Lys	660	665	670
Glu	Ala	Phe	Glu	Lys	Asn	Ser	Ser	Leu	Thr	Phe	Lys	Tyr	Lys	Leu	Gln	675	680	685
Val	Asn	Lys	Gln	Lys	Leu	Leu	Asp	Lys	Asn	Lys	Asn	Arg	Thr	Lys	Arg	690	695	700
Asp	Thr	Ser	Thr	Glu	Asn	Lys	Thr	Ser	Val	Thr	Lys	Asp	Ile	Ile	Ser	705	710	715
Asn	Thr	Val	Asn	Tyr	Lys	Ile	Asn	Asn	Gln	Glu	Val	Lys	Gly	Asn	Lys	725	730	735
Leu	Asp	Asp	Val	Lys	Leu	Thr	Tyr	Thr	Lys	Glu	Thr	Val	Pro	Val	Pro	740	745	750
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Gly	His	Gly	Pro	Ser	Val	Asp	Ile	Val	Glu	Asp	Thr	Gly	Thr	Gly	Ala	805	810	815
Glu	Gly	Gly	Ala	Gln	Asn	Gly	Val	Val	Ser	Thr	Gln	Glu	Asn	Arg	Asp	820	825	830
Pro	Ile	Val	Asp	Ile	Thr	Glu	Asp	Thr	Gln	Pro	Gly	Met	Ser	Gly	Ser			

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Gln	Pro	Ser	Val	Ser	Gly	Ser	Asn	Asp	Ala	Thr	Val	Val	Glu	Glu	Asp
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		900						905					910		
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	915					920						925			
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930						935					940				
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945				950						955					960
Ser	Leu	Pro	Gln	Ala	Pro	Val	Tyr	Lys	Ala	Ala	His	His	Leu	Pro	Ala
			965						970					975	
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Asn

<210> 8  
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 <213> Streptococcus pyogenes

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<211> 806

<212> PRT

<213> Streptococcus pyogenes

<400> 9

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<211> 2418

<212> DNA

<213> Streptococcus pyogenes

<400> 10

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<211> 553

<212> PRT

<213> Streptococcus pyogenes

<400> 11

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Gln	Val	Glu	Ser	Thr	Glu	Asp	Lys	Lys	Lys	Glu	Lys	Asp	Arg	Glu	Asp
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Ile	Glu	Lys	Glu	Arg	Asn	Glu	Lys	Phe	Asp	Asn	Tyr	Leu	Lys	Gln	Met
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<212> PRT

<213> Streptococcus pyogenes

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Thr	Thr	Ala	Thr	Thr	Asn	Gly	Gly	Pro	Gln	Ser	Thr	Pro	Ala	Val	Ala
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Glu	Ala	Thr	Pro	Gln	Pro	Gln	Ala	Gln	Ile	Ala	Pro	Val	Ala	Ala	Ala
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Glu	Val	Glu	Lys	Tyr	Thr	Val	Asp	Lys	Glu	Asn	Ser	Lys	Leu	Asn	Ile
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Lys	Asp	Gly	Lys	Thr	Pro	Lys	Thr	Gly	Ser	Ser	Val	Asn	Asn	Glu	Lys
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Asp	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Lys	Leu	Arg	Asp	Ile	Val
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Lys	Lys	Ala	Lys	Ala	Asn	Tyr	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	Ala
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Glu Asn Ser

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<211> 21

<212> PRT \

<213> Streptococcus pyogenes

<400> 16

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<212> PRT

<213> Streptococcus pyogenes

<400> 17

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<213> Streptococcus pyogenes

<400> 18

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<213> Streptococcus pyogenes

<400> 19

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<213> Streptococcus pyogenes

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<210> 22

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<400> 22

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<213> Streptococcus pyogenes

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 Lys Arg Pro Asp Ile Leu Val Gly Gly Gln Ser Asp Pro Ile Asp Ile  
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 Gly Ala Ser Ser Val Ala Ser Ser Ala Ser Ser Ser Ser Asn Gly Ser  
 1 5 10 15  
 Val Ala Ser Ser Ser Glu Pro Gln Met Pro Gln Ala Gln Thr Ala Pro  
 20 25 30  
 Gln Met

<210> 30  
 <211> 246  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 30  
 Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Thr Thr Gly Ser Thr  
 1 5 10 15  
 Glu Thr Ser Ala Ala Ser Thr Thr Thr Asn Thr Ala Ser Thr Val Glu  
 20 25 30  
 Thr Ser Thr Thr Thr Gly Thr Ser Val Thr Ala Ala Ser Glu Ala Ser  
 35 40 45  
 Ser Glu Ser Ser Asp Ala Ser Val Val Ser Ser Gly Gly Arg Gln Thr

50		55		60	
Ser Glu Ser Ala Gln	Ala Ser Lys Gln Pro	Gln Ala Gln Thr Ala Val			
65	70	75	80		
Ala Ser Ser Ser Ser	Ser Ser Lys Ala Asn	Glu Ser Ser Ser Ser	Ala		
	85	90	95		
Ser Asp Val Lys Ala	Pro Lys Ala Val	Ser Thr Thr Ser Ser	Ser Ala		
	100	105	110		
Thr Val Ala Ser Pro	Ser Asn Gly Ser	Asn Lys Glu Ala Asn	Ala Glu		
	115	120	125		
Thr Glu Pro Gln Gln	Met Met Glu Val	Glu Lys Tyr Thr Val	Asp Lys		
	130	135	140		
Glu Asn Ser Glu Leu	Lys Val Lys Asp	Gly Thr Gln Pro Lys	Lys Gly		
145	150	155	160		
Ser Thr Val Asn Glu	Asn Thr Lys Leu	Ile Arg Asn Arg Asp	Gly Lys		
	165	170	175		
Gln Arg Asp Ile Val	Asp Val Thr Arg	Thr Val Lys Thr Asn	Glu Asp		
	180	185	190		
Gly Thr Ile Asp Val	Thr Val Thr Val	Lys Pro Lys Gln Ile	Asp Glu		
	195	200	205		
Gly Ala Asp Val Met	Ala Leu Leu Asp	Val Ser Lys Lys Met	Thr Gln		
	210	215	220		
Glu Asn Phe Asp Lys	Ala Lys Glu Gln	Ile Lys Lys Met Val	Thr Thr		
225	230	235	240		
Leu Thr Ser Lys Thr	Asp				
	245				

<210> 31  
 <211> 923  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 31	
Ile Ala Pro Thr Val	Leu Gly Gln Glu Val Ser Ala Asn Thr Glu Thr
1	5 10 15
Ser Thr Thr Pro Ala	Thr Thr Thr Pro Ser Ala Gly Thr Gly Thr Ala
	20 25 30
Thr Thr Ser Gly Thr	Ala Thr Thr Thr Pro Ser Ala Thr Thr Asp Ala
	35 40 45
Gly Gly Ala Ala Gly	Ser Gly Thr Asn Gly Ala Ser Ser Val Thr Ser
	50 55 60
Ser Gly Gly Ser Gln	Ser Ser Glu Ser Ala Gln Ala Ser Pro Gln Ala
65	70 75 80
Gln Ala Ala Pro Ala	Ala Ala Ala Glu Thr Thr Pro Lys Ala Gln Ala Gln
	85 90 95
Thr Ala Thr Val Ala	Ser Ala Ser Thr Thr Ala Ser Ser Ser Ser Ser
	100 105 110
Asp Gly Lys Ala Pro	Gln Ala Ala Ser Thr Thr Ser Ser Ser Thr Pro
	115 120 125
Ala Val Ala Ser Asn	Asn Ser Asn Gln Glu Ala Gly Thr Glu Ala Glu
	130 135 140
Thr Pro Met Met Glu	Val Glu Gln Tyr Thr Val Asp Asn Lys Ala Thr
145	150 155 160
Glu Leu Asn Ile Lys	Asp Gly Lys Asn Leu Lys Asn Gly Ser Arg Val
	165 170 175
Val Asp Lys Asn Thr	Lys Leu Ile Arg Asn Arg Asp Gly Glu Gln Arg
	180 185 190
Asp Ile Val Asp Ile	Lys Arg Glu Val Lys Thr Asn Ala Asp Gly Thr



Pro	Val	Ala	Asp	Glu	Leu	Lys	Asn	Ser	Asn	Lys	Asn	Ser	Ile	Thr	His
			660					665					670		
Gln	Lys	Ala	Ser	Ser	Trp	Phe	Leu	Arg	Ser	Thr	Lys	Glu	Ser	Leu	Thr
		675					680					685			
Trp	Thr	Ile	Ser	Lys	Asp	Gln	Leu	Lys	Lys	Ala	Phe	Glu	Asp	Gly	Lys
	690				695					700					
Pro	Leu	Thr	Leu	Thr	Tyr	Lys	Leu	Lys	Val	Asp	Asn	Asn	Lys	Phe	Lys
705					710					715					720
Thr	Ala	Leu	Glu	Glu	Glu	Lys	Lys	Lys	Arg	Ala	Lys	Arg	Ser	Thr	Pro
				725					730					735	
Thr	Glu	Asn	Glu	Asn	Ser	Val	Thr	Glu	Lys	Ile	Ile	Ser	Asn	Thr	Ile
			740					745					750		
Thr	Tyr	Gln	Ile	Asn	Gln	Lys	Lys	Gly	Thr	Asp	Lys	Ser	Leu	Gly	Asp
		755					760					765			
Val	Lys	Leu	Thr	Tyr	Ser	Lys	Leu	Lys	Val	Pro	Val	Pro	Gln	Ile	Asp
	770					775					780				
Gly	His	Val	Ile	Glu	Pro	Gln	Ala	Pro	Thr	Leu	Pro	Lys	Leu	Pro	Pro
785					790					795					800
Val	Ile	Glu	His	Gly	Pro	Asn	Phe	Glu	Tyr	Glu	Glu	Glu	Thr	Gly	Tyr
				805					810					815	
Gln	Leu	Pro	Leu	Lys	His	Gly	Ser	Asn	Ala	Pro	Asp	Thr	Gln	Val	Thr
			820					825					830		
Ile	Glu	Glu	Asp	Thr	Val	Pro	Gln	Arg	Pro	Asp	Ile	Leu	Val	Gly	Gly
		835					840					845			
Gln	Ser	Gly	Pro	Val	Asp	Ile	Thr	Glu	Asp	Thr	Gln	Pro	Gly	Met	Ser
	850					855					860				
Gly	Ser	Asn	Asp	Ala	Thr	Val	Val	Glu	Glu	Asp	Thr	Ala	Pro	Lys	Arg
865					870					875					880
Pro	Asp	Val	Leu	Val	Gly	Gly	Gln	Ser	Asp	Pro	Ile	Asp	Ile	Thr	Glu
				885					890					895	
Asp	Thr	Gln	Pro	Ser	Val	Ser	Gly	Ser	Asn	Asp	Ala	Thr	Val	Val	Glu
			900					905					910		
Glu	Asp	Thr	Val	Pro	Lys	Arg	Pro	Asp	Ile	Leu					
		915					920								

<210> 32

<211> 454

<212> PRT

<213> Streptococcus pyogenes

<400> 32

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Thr	Thr	Gly	Ser	Thr
1				5					10					15	
Glu	Thr	Ser	Ala	Ala	Ser	Thr	Ala	Ser	Val	Asp	Ala	Thr	Thr	Ser	Gly
			20					25					30		
Thr	Thr	Ala	Ser	Gly	Ala	Ser	Gly	Glu	Ser	Ser	Asp	Ala	Ser	Val	Ala
		35					40					45			
Ser	Ser	Glu	Gly	Ser	Gln	Gly	Ser	Glu	Ser	Ala	Pro	Ala	Ser	Pro	Gln
	50					55					60				
Pro	Gln	Pro	Gln	Ala	Gln	Thr	Ala	Pro	Ala	Ala	Thr	Ser	Ala	Ser	Ser
65					70					75					80
Lys	Ala	Lys	Thr	Glu	Glu	Gln	Thr	Pro	Lys	Ala	Ala	Thr	Ser	Ser	Thr
				85					90					95	
Pro	Ser	Thr	Pro	Ala	Ala	Ser	Ser	Ser	Ser	Asn	Ser	Asn	Gln	Glu	Ala
			100					105					110		
Ser	Ala	Glu	Thr	Glu	Pro	Gln	Met	Met	Asp	Val	Glu	Lys	Tyr	Thr	Val

		115				120				125					
Asp	Lys	Glu	Ser	Ser	Glu	Leu	Lys	Val	Lys	Asp	Gly	Lys	Lys	Pro	Lys
	130					135					140				
Asn	Glu	Asn	Lys	Val	Asp	Lys	Asp	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp
145					150					155					160
Gly	Glu	Gln	Arg	Asp	Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Thr	Asn
				165					170						175
Ala	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Thr	Pro	Lys	Glu	Ile
			180					185					190		
Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Gln	Lys	Met
	195					200					205				
Thr	Lys	Glu	Asn	Phe	Asp	Lys	Ala	Lys	Glu	Gln	Ile	Lys	Lys	Met	Val
210					215						220				
Thr	Thr	Leu	Thr	Gly	Glu	Pro	Thr	Asp	Gly	Lys	Glu	Asn	Arg	Asn	Arg
225					230					235					240
Arg	Asn	Ser	Val	Arg	Leu	Met	Thr	Phe	Tyr	Arg	Lys	Ile	Ser	Glu	Pro
				245					250					255	
Ile	Asp	Leu	Ser	Gly	Lys	Thr	Ser	Glu	Glu	Val	Glu	Lys	Glu	Leu	Asp
			260					265					270		
Asn	Ile	Trp	Asp	Lys	Val	Lys	Lys	Glu	Asp	Trp	Asp	Trp	Gly	Val	Asp
	275						280					285			
Leu	Gln	Gly	Ala	Ile	His	Lys	Ala	Arg	Asp	Ile	Phe	Lys	Lys	Glu	Lys
	290					295					300				
Glu	Ser	Lys	Lys	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser
305					310					315					320
Thr	Phe	Ser	Tyr	Asp	Ile	Asn	Asp	Lys	Asp	Lys	Asn	Asn	Thr	Val	Arg
				325					330					335	
Lys	Asn	Arg	Ile	Thr	Gly	Lys	Val	Thr	Thr	Ser	Asn	Pro	Leu	Phe	Pro
			340					345					350		
Trp	Leu	Pro	Ile	Phe	Asn	His	Thr	Asn	Gln	Lys	Ala	Glu	Val	Ile	Asp
	355						360					365			
Asp	Val	Asp	Lys	Leu	Leu	Asp	Phe	Ala	Glu	Lys	Met	Gly	Ile	Ser	Leu
	370					375					380				
Pro	Lys	Gly	Leu	Arg	Ala	Gly	Val	Gln	Ala	Ile	Gly	Leu	Ser	Asn	Ser
385					390					395					400
Phe	Leu	Ser	Thr	Phe	Thr	Gly	Ser	Gly	Leu	Thr	Glu	Tyr	Leu	Thr	Leu
				405					410					415	
Asn	Glu	Tyr	Gly	Ser	Asp	Ile	Leu	Lys	Glu	Lys	Gln	Phe	Asp	Tyr	Thr
			420					425					430		
Lys	Arg	Val	Gly	Glu	Gly	Tyr	Tyr	Tyr	His	Ser	Tyr	Ser	Lys	Arg	Thr
	435						440					445			
His	Gly	Asp	Lys	Met	Pro										
	450														

<210> 33  
 <211> 409  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 33  
 Glu Thr Ser Thr Thr Thr Ser Thr Ser Gly Thr Ala Ala Ser Gly Ala  
 1 5 10 15  
 Gly Ser Glu Ser Ser Asp Ala Ser Val Val Pro Ser Glu Gly Ser Gln  
 20 25 30  
 Ser Ser Gly Thr Thr Thr Pro Ala Ser Lys Gln Pro Gln Ala Gln Thr  
 35 40 45  
 Ala Pro Ala Ala Thr Ser Ala Ser Ser Thr Ser Ser Ser Ser Ser Asp

50		55		60
Gly Lys Ala Pro Gln Ala Ala Thr Ile Ser Thr Ser Ser Thr Pro Ala				
65		70		75
Ala Gly Thr Ser Ser Asn Ser Asn Gln Val Thr Gly Thr Glu Ala Glu				80
		85		90
Pro Gln Thr Met Asp Val Glu Arg Tyr Thr Val Asp Lys Glu Asn Ser				95
		100		105
Lys Leu Asn Ile Lys Asp Gly Asp Lys Pro Lys Asn Arg Ser Ser Val				110
		115		120
Asp Lys Asp Thr Lys Leu Ile Arg Asn Arg Asp Gly Lys Gln Arg Asp				125
		130		135
Ile Val Asp Val Thr Arg Thr Val Lys Thr Asn Glu Asp Gly Thr Ile				140
		145		150
Asp Val Thr Val Thr Val Lys Pro Lys Gln Ile Asp Glu Gly Ala Asp				155
		165		170
Val Met Ala Leu Asp Val Ser Lys Lys Met Ser Glu Asp Asp Phe				175
		180		185
Asn Asn Ala Lys Asp Lys Ile Lys Lys Leu Val Thr Thr Leu Thr Ser				190
		195		200
Lys Ser Ala Asn Gly Gln Gln Asn Leu Asn Asn Arg Asn Thr Val Arg				205
		210		215
Leu Met Thr Phe Tyr Arg Lys Ile Ser Asp Pro Ile Asp Leu Ser Gly				220
		225		230
Lys Thr Ser Glu Glu Val Glu Glu Glu Leu Asn Lys Ile Trp Asp Lys				235
		245		250
Val Lys Thr Lys Asp Trp Asp Trp Gly Val Asp Leu Gln Gly Ala Ile				255
		260		265
His Lys Ala Arg Asp Ile Phe Lys Lys Glu Lys Glu Ser Lys Lys Arg				270
		275		280
Gln His Ile Val Leu Phe Ser Gln Gly Glu Ser Thr Phe Ser Tyr Glu				285
		290		295
Leu His Asn Ser Val Lys Glu Asp Lys Tyr Lys Leu Ser Arg Leu Thr				300
		305		310
Glu Thr Val Thr Ser Ser Asn Pro Leu Leu Pro Trp Pro Pro Ile Phe				315
		325		330
Asn His Thr His Lys Asn Ile Asp Met Leu Asp Asp Val Lys His Leu				335
		340		345
Ile Lys Leu Gly Gln Ala Leu Gly Ile Lys Glu Leu Asp Ser Leu Gln				350
		355		360
				365
Ser Thr Leu Lys Leu Val Ser Ala Gly Ser Asn Ala Ala Gly Leu Leu				
		370		375
Leu Gly Gly Gly Ser Leu Thr Glu Tyr Leu Thr Leu Lys Glu Tyr Lys				380
		385		390
Ser Gly Asn Leu Thr Glu Asn Gln Phe				395
		405		400

<210> 34

<211> 232

<212> PRT

<213> Streptococcus pyogenes

<400> 34

Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Thr Ser Ala Ser Ser				
1		5		10
Thr Glu Thr Ser Ala Asn Thr Asn Thr Asn Thr Ser Thr Ala Ser Ala				15
		20		25
				30

Gly	Thr	Gly	Thr	Ser	Gly	Thr	Ala	Ser	Thr	Thr	Pro	Ser	Val	Gly	Thr
		35					40					45			
Ser	Thr	Gly	Gly	Ala	Ala	Gly	Gly	Glu	Ala	Ala	Val	Ala	Ser	Ser	Gly
	50					55					60				
Gly	Ser	Gln	Ser	Ser	Asp	Thr	Thr	Pro	Ala	Ser	Pro	Gln	Ala	Gln	Thr
65					70					75				80	
Ser	Glu	Gln	Pro	Ala	Ala	Thr	Ser	Thr	Ser	Ser	Asn	Ser	Ser	Ser	Asp
				85					90					95	
Gly	Gln	Thr	Pro	Lys	Thr	Ala	Thr	Thr	Ser	Pro	Ser	Thr	Pro	Val	Val
			100					105					110		
Ala	Asn	Ser	Asn	Gly	Asn	Gln	Val	Thr	Gly	Thr	Glu	Ala	Ser	Pro	Gln
	115						120					125			
Met	Met	Asp	Val	Glu	Lys	Tyr	Thr	Val	Asp	Lys	Glu	Ser	Ser	Glu	Leu
	130					135					140				
Asn	Ile	Lys	Asp	Gly	Lys	Thr	Pro	Lys	Asn	Gly	Ile	Ser	Val	Thr	Lys
145					150					155					160
Asp	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Lys	Gln	Arg	Asp	Ile	Val
				165					170					175	
Asp	Val	Thr	Arg	Thr	Val	Lys	Ala	Asn	Glu	Asp	Gly	Thr	Ile	Asp	Val
			180					185					190		
Thr	Val	Thr	Val	Lys	Pro	Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met
	195						200					205			
Ala	Leu	Leu	Asp	Val	Ser	Lys	Lys	Met	Thr	Gln	Glu	Asn	Phe	Asp	Lys
	210					215					220				
Ala	Lys	Glu	Gln	Ile	Lys	Lys	Leu								
225						230									

<210> 35

<211> 250

<212> PRT

<213> Streptococcus pyogenes

<400> 35

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Thr	Thr	Gly	Ser	Thr
1				5					10					15	
Glu	Thr	Ser	Ala	Ala	Ser	Thr	Ala	Ser	Pro	Gly	Thr	Gly	Thr	Ala	Thr
			20					25					30		
Thr	Ser	Val	Thr	Ala	Ala	Ser	Gly	Ala	Gly	Ser	Glu	Ala	Thr	Glu	Ala
	35						40					45			
Thr	Ala	Thr	Thr	Thr	Asn	Gly	Gly	Pro	Gln	Ser	Ala	Thr	Val	Thr	Ser
	50					55					60				
Glu	Ala	Thr	Pro	Lys	Ala	Gln	Ala	Gln	Thr	Ser	Glu	Gln	Pro	Ala	Ala
65					70					75				80	
Thr	Ser	Ala	Ser	Ser	Thr	Ser	Ser	Ser	Lys	Ala	Lys	Thr	Glu	Glu	Gln
				85					90					95	
Thr	Pro	Lys	Ala	Ala	Thr	Ser	Ser	Thr	Pro	Ser	Thr	Pro	Ala	Ala	Ser
			100					105					110		
Ser	Ser	Ser	Asn	Ser	Asn	Gln	Gly	Ala	Ser	Thr	Glu	Thr	Glu	Pro	Gln
	115						120					125			
Met	Met	Glu	Val	Glu	Gln	Tyr	Lys	Val	Asp	Lys	Glu	Glu	Thr	Glu	Leu
	130					135					140				
Lys	Val	Lys	Asp	Gly	Asn	Gln	Pro	Lys	Asn	Glu	Arg	Ser	Val	Ser	Gln
145					150					155					160
Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Glu	Gln	Arg	Asp	Ile	Val
				165					170					175	
Asp	Ile	Lys	Arg	Glu	Val	Lys	Asp	Asn	Gly	Asp	Gly	Thr	Leu	Asp	Val
			180					185					190		

Thr	Leu	Lys	Val	Thr	Pro	Lys	Glu	Ile	Asp	Lys	Gly	Ala	Asp	Val	Met
		195					200					205			
Ala	Leu	Leu	Asp	Val	Ser	Gln	Lys	Met	Thr	Asp	Ala	Asp	Phe	Asp	Asn
	210					215					220				
Ala	Lys	Glu	Lys	Ile	Lys	Lys	Leu	Val	Thr	Thr	Leu	Thr	Ser	Lys	Ser
225					230					235					240
Asn	Ser	Asp	Glu	His	Lys	His	Asn	Ser	Arg						
			245						250						

<210> 36

<211> 197

<212> PRT

<213> Streptococcus pyogenes

<400> 36

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Thr	Glu	Thr	Ser	Thr
1				5					10					15	
Thr	Ser	Thr	Ala	Ser	Thr	Thr	Thr	Gly	Thr	Ser	Gly	Thr	Ala	Thr	Thr
			20					25					30		
Thr	Pro	Ser	Ala	Ile	Thr	Gly	Thr	Asp	Gly	Ala	Ala	Gly	Ser	Gly	Thr
		35					40					45			
Ser	Asp	Val	Ser	Val	Val	Ser	Ser	Glu	Gly	Ser	Gln	Ser	Ser	Glu	Ser
	50					55					60				
Ala	Gln	Ala	Ser	Pro	Gln	Ala	Gln	Thr	Ala	Thr	Val	Ala	Ser	Ala	Ser
65					70					75					80
Thr	Thr	Ala	Ser	Pro	Ser	Ser	Ser	Ser	Ala	Ser	Asp	Gly	Lys	Ala	Pro
				85					90					95	
Gln	Ala	Ala	Ser	Thr	Thr	Ser	Ser	Ser	Ala	Thr	Val	Ala	Asn	Pro	Ser
			100					105					110		
Asn	Gly	Ser	Asn	Gln	Val	Thr	Gly	Thr	Glu	Val	Glu	Pro	Gln	Met	Met
	115						120					125			
Asp	Val	Glu	Gln	Tyr	Lys	Val	Asn	Lys	Glu	Lys	Thr	Glu	Leu	Thr	Val
	130					135					140				
Lys	Asp	Asp	Lys	Gln	Gln	Leu	Lys	Ile	Arg	Lys	Asp	Val	Asp	Glu	Leu
145					150					155					160
Lys	Asn	Lys	Asp	Leu	Phe	Asp	Val	Lys	Arg	Glu	Val	Lys	Asp	Asn	Gly
			165						170					175	
Asp	Gly	Thr	Leu	Asp	Val	Thr	Leu	Lys	Val	Met	Pro	Lys	Gln	Ile	Asp
			180					185					190		
Glu	Gly	Ala	Asp	Val											
		195													

<210> 37

<211> 873

<212> PRT

<213> Streptococcus pyogenes

<400> 37

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Ala	Asn	Thr	Glu	Thr
1				5					10					15	
Ser	Thr	Thr	Pro	Ala	Thr	Thr	Thr	Pro	Ser	Ala	Gly	Thr	Gly	Thr	Ala
			20					25					30		
Thr	Thr	Ser	Gly	Thr	Ala	Thr	Thr	Thr	Pro	Ser	Ala	Thr	Thr	Asp	Ala
		35					40					45			
Gly	Gly	Ala	Ala	Gly	Ser	Gly	Thr	Asn	Gly	Ala	Ser	Ser	Val	Thr	Ser
	50					55					60				
Ser	Gly	Gly	Ser	Gln	Ser	Ser	Glu	Ser	Ala	Gln	Ala	Ser	Pro	Gln	Ala

65					70					75					80
Gln	Ala	Ala	Pro	Ala	Ala	Ala	Glu	Thr	Thr	Pro	Lys	Ala	Gln	Ala	Gln
				85					90					95	
Thr	Ala	Thr	Val	Ala	Ser	Ala	Ser	Thr	Thr	Ala	Ser	Ser	Ser	Ser	Ser
			100					105					110		
Asp	Gly	Lys	Ala	Pro	Gln	Ala	Ala	Ser	Thr	Thr	Ser	Ser	Ser	Thr	Pro
		115					120					125			
Ala	Val	Ala	Ser	Asn	Asn	Ser	Asn	Gln	Glu	Ala	Gly	Thr	Glu	Ala	Glu
	130					135					140				
Thr	Pro	Met	Met	Glu	Val	Glu	Gln	Tyr	Thr	Val	Asp	Asn	Lys	Ala	Thr
145					150					155					160
Glu	Leu	Asn	Ile	Lys	Asp	Gly	Lys	Asn	Leu	Lys	Asn	Gly	Ser	Arg	Val
				165					170					175	
Val	Asp	Lys	Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Glu	Gln	Arg
			180					185					190		
Asp	Ile	Val	Asp	Ile	Lys	Arg	Glu	Val	Lys	Thr	Asn	Ala	Asp	Gly	Thr
	195						200					205			
Ile	Asp	Val	Thr	Val	Thr	Val	Thr	Pro	Lys	Glu	Ile	Asp	Glu	Gly	Ala
	210					215					220				
Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Lys	Lys	Met	Thr	Asp	Ala	Asp
225					230					235					240
Phe	Lys	Asn	Ala	Lys	Asp	Lys	Ile	Lys	Lys	Leu	Val	Thr	Thr	Leu	Thr
				245					250					255	
Ser	Asn	Ser	Asp	Asn	Ala	Glu	His	Lys	His	Asn	Ser	Arg	Asn	Ser	Val
			260					265					270		
Arg	Leu	Met	Thr	Phe	Tyr	Arg	Glu	Ile	Ser	Asp	Pro	Ile	Asp	Ile	Ser
		275					280					285			
Gly	Lys	Thr	Asp	Ala	Glu	Leu	Asp	Lys	Ile	Leu	Asn	Asp	Leu	Arg	Glu
	290					295					300				
Lys	Ala	Lys	Ala	Asn	Tyr	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	Ala	Ile
305				310						315					320
His	Lys	Ala	Arg	Glu	Ile	Phe	Lys	Lys	Asp	Gln	Glu	Lys	Lys	Ser	Gly
				325					330					335	
Lys	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	Thr	Phe	Ser
			340					345					350		
Tyr	Asp	Ile	Lys	Asn	Lys	Asn	Asp	Ser	Lys	Leu	Lys	Lys	Ala	Arg	Leu
	355						360					365			
Thr	Thr	Val	Thr	Thr	Ser	Asn	Pro	Leu	Phe	Ser	Trp	Phe	Pro	Ile	Phe
	370					375					380				
Asp	Arg	Thr	Asn	Arg	Lys	Ala	Asp	Met	Leu	Asp	Gly	Phe	Asp	Lys	Leu
385					390				395						400
Leu	Ser	Ile	Ala	Gln	Lys	Phe	Gly	Val	Glu	Ile	Pro	Asn	Gly	Leu	Lys
				405					410					415	
Thr	Gly	Leu	Lys	Ala	Ala	Ala	Thr	Thr	Asn	Ser	Leu	Leu	Ser	Ser	Phe
			420					425					430		
Thr	Gly	Gly	Asp	Gly	Leu	Thr	Asp	Tyr	Leu	Thr	Leu	Arg	Glu	Tyr	Met
	435						440					445			
Ala	Asp	Lys	Leu	Gln	Glu	Thr	Asp	Phe	Asn	Tyr	Ser	Asn	Arg	Val	Gly
	450					455					460				
Glu	Gly	Tyr	His	His	His	Ser	Phe	Ser	Glu	Arg	Asn	Thr	His	Asp	Met
465				470						475					480
Pro	Met	Lys	Glu	Thr	Leu	Glu	Lys	Leu	Leu	Asp	Ser	Gln	Ile	Pro	Arg
				485					490					495	
Leu	Asp	Lys	Glu	Ser	Trp	Phe	Gly	Trp	Ala	Leu	Asp	Lys	Leu	Ser	Leu
		500					505					510			
Thr	Glu	Thr	Tyr	Gln	Asn	Gly	Gln	Lys	Val	Ala	Leu	Met	Lys	Ile	Leu
		515					520					525			

Asp	Tyr	Leu	Phe	Tyr	Lys	Arg	Glu	Tyr	Val	Tyr	Tyr	Asn	His	Asn	Leu
530						535					540				
Ser	Ala	Ile	Ala	Glu	Ala	Lys	Met	Ala	Gln	Gln	Glu	Gly	Ile	Thr	Phe
545					550					555					560
Tyr	Ser	Val	Asp	Val	Thr	Asp	Phe	Glu	Thr	Thr	Ser	Lys	Arg	Val	Lys
			565						570					575	
Arg	Gln	Val	Gly	Val	Leu	Gln	Glu	Thr	Ala	Lys	Lys	Glu	Pro	Glu	Lys
			580					585					590		
Glu	Arg	Asn	Asp	Lys	Phe	Asp	Lys	Tyr	Leu	Glu	Asp	Met	Ser	Glu	Gly
		595					600					605			
Lys	Lys	Phe	Leu	Lys	Asp	Ile	Asp	Asn	Gln	Asp	Lys	Phe	Lys	Asp	Ile
610						615					620				
Leu	Thr	Asp	Val	Thr	Val	Thr	Glu	Thr	Phe	Glu	Gly	Gln	Val	Ala	Ala
625					630					635					640
Gly	Ser	Asp	Ser	Trp	Ser	Asn	Ser	His	Gly	Val	Val	Lys	Tyr	Gln	Lys
			645						650					655	
Asn	Glu	Asn	Gly	Gly	Trp	Phe	Thr	Thr	Ser	Lys	Lys	Glu	Ser	Leu	Thr
			660					665					670		
Trp	Thr	Ile	Ser	Lys	Glu	Gln	Leu	Lys	Lys	Ala	Phe	Glu	Asp	Gly	Lys
		675					680					685			
Pro	Leu	Thr	Phe	Thr	Tyr	Lys	Leu	Lys	Val	Glu	Lys	Asp	Lys	Phe	Lys
690						695					700				
Thr	Ala	Leu	Glu	Glu	Asn	Lys	Lys	Gln	Arg	Thr	Lys	Arg	Ser	Ala	Pro
705					710					715					720
Thr	Glu	Asn	Glu	Asn	Ser	Val	Thr	Lys	Lys	Ile	Ile	Ser	Asn	Thr	Val
				725					730					735	
Thr	Tyr	Lys	Ile	Asn	Asn	Gln	Glu	Val	Lys	Asp	Asn	Asn	Leu	Asp	Glu
			740					745					750		
Val	Asn	Leu	Thr	Tyr	Ser	Lys	Leu	Lys	Val	Pro	Val	Pro	Gln	Ile	Asp
		755					760					765			
Gly	Gln	Val	Ile	Glu	Pro	Gln	Ala	Pro	Lys	Leu	Pro	Glu	Leu	Pro	Pro
770						775					780				
Val	Thr	Glu	Arg	Gly	Pro	Val	Leu	Asp	Tyr	Thr	Glu	Glu	Ser	Ile	Tyr
785					790					795					800
Arg	Leu	Pro	Leu	Glu	His	Gly	Ser	Asn	Ala	Pro	Asp	Thr	Gln	Val	Thr
				805					810					815	
Ile	Glu	Glu	Asp	Thr	Val	Pro	Gln	Arg	Pro	Asp	Ile	Leu	Val	Gly	Gly
			820					825					830		
Gln	Ser	Gly	Pro	Val	Asp	Ile	Thr	Glu	Asp	Thr	Gln	Pro	Gly	Met	Ser
		835					840					845			
Gly	Ser	Asn	Asp	Ala	Thr	Val	Val	Glu	Glu	Asp	Thr	Thr	Pro	Lys	Arg
850						855					860				
Pro	Asp	Val	Leu	Val	Gly	Gly	Gln	Ser							
865						870									

<210> 38  
 <211> 245  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 38  
 Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Ala Ser Thr Thr Ser  
 1 5 10 15  
 Ser Thr Glu Thr Ser Ala Thr Thr Ser Thr Ser Thr Gly Thr Ser Glu  
 20 25 30  
 Thr Ala Ala Ser Glu Ala Gly Ser Gly Ala Ser Asp Val Ser Ile Ala

		35				40					45				
Ser	Ser	Gly	Gly	Ser	Gln	Ser	Ser	Gly	Thr	Thr	Pro	Ser	Ala	Thr	Thr
	50					55					60				
Gly	Thr	Gly	Glu	Ala	Ala	Gly	Ser	Gly	Thr	Thr	Val	Ala	Thr	Ala	Thr
65					70					75					80
Thr	Thr	Asn	Gly	Gly	Thr	Gln	Ser	Thr	Pro	Ala	Ala	Ala	Ser	Ala	Ser
				85					90					95	
Ser	Thr	Ser	Ser	Thr	Ser	Ser	Thr	Ser	Ser	Ser	Glu	Asp	Lys	Ala	Pro
			100					105					110		
Lys	Ala	Ala	Ser	Thr	Thr	Leu	Ser	Ser	Ala	Thr	Val	Ala	Ser	Pro	Ser
		115					120					125			
Asn	Gly	Ser	Asn	Gln	Glu	Ala	Ser	Ala	Glu	Thr	Ala	Pro	Gln	Met	Met
	130					135					140				
Asp	Val	Glu	Arg	Tyr	Glu	Val	Asp	Asn	Lys	Glu	Thr	Glu	Leu	Lys	Val
145					150					155					160
Lys	Asp	Gly	Lys	Glu	Thr	Asn	Gly	Ser	Gly	Val	Ser	Lys	Lys	Leu	Ile
				165					170					175	
Arg	Asn	Arg	Asp	Asp	Glu	Gln	Arg	Gly	Ile	Val	Asp	Val	Lys	Arg	Glu
			180					185					190		
Val	Lys	Thr	Asn	Ser	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Lys
		195					200					205			
Pro	Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val
	210					215					220				
Ser	Lys	Lys	Met	Thr	Glu	Glu	Asp	Phe	Lys	Asn	Ala	Lys	Asp	Lys	Ile
225					230					235					240
Lys	Lys	Leu	Val	Lys											
				245											

<210> 39

<211> 1029

<212> PRT

<213> Streptococcus pyogenes

<400> 39

Met	Thr	Asn	Cys	Lys	Tyr	Lys	Leu	Arg	Lys	Leu	Ser	Val	Gly	Leu	Val
1				5					10					15	
Ser	Val	Gly	Thr	Met	Leu	Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val
			20					25					30		
Ser	Thr	Gly	Val	Ser	Asn	Thr	Glu	Ala	Ser	Ala	Ser	Ser	Thr	Asn	Thr
		35					40					45			
Asn	Thr	Ala	Ser	Ala	Asp	Ala	Thr	Ala	Ser	Gly	Thr	Ala	Ala	Thr	Thr
	50					55					60				
Pro	Ser	Ala	Gly	Thr	Ser	Thr	Ser	Thr	Gly	Glu	Ala	Ala	Gly	Ser	Gly
65					70					75				80	
Leu	Ser	Ser	Glu	Ala	Asn	Trp	Ser	Asp	Ala	Ala	Val	Ala	Ser	Ser	Gly
				85					90					95	
Gly	Ser	Gln	Ser	Ser	Gly	Thr	Thr	Pro	Ala	Ser	Pro	Gln	Ala	Gln	Thr
			100					105					110		
Ala	Pro	Ala	Ala	Thr	Thr	Thr	Thr	Ser	Ser	Ala	Ser	Ser	Ser	Asn	Glu
		115					120					125			
Lys	Pro	Leu	Lys	Thr	Ala	Thr	Thr	Thr	Thr	Ser	Ser	Thr	Pro	Ala	Ala
	130					135				140					
Ser	Ser	Ser	Ser	Asn	Gly	Asn	Gln	Val	Thr	Gly	Thr	Glu	Val	Glu	Pro
145				150						155					160
Gln	Met	Met	Asp	Val	Glu	Gln	Tyr	Lys	Val	Asp	Lys	Glu	Asn	Ser	Glu
			165						170					175	
Leu	Thr	Val	Lys	Val	Asp	Arg	Arg	Gln	Leu	Lys	Ile	Arg	Lys	Asp	Val

			180					185				190			
Asp	Asn	Pro	Lys	Asp	Lys	Asp	Leu	Phe	Asp	Val	Lys	Arg	Glu	Val	Lys
		195					200					205			
Asp	Asn	Gly	Gly	Gly	Thr	Leu	Asp	Val	Thr	Leu	Lys	Val	Met	Pro	Lys
	210					215					220				
Gln	Ile	Asp	Gly	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Lys
225					230					235					240
Lys	Met	Thr	Gln	Glu	Asn	Phe	Asp	Lys	Ala	Lys	Gly	Gln	Ile	Lys	Lys
			245						250					255	
Val	Val	Thr	Thr	Leu	Thr	Gly	Glu	Ser	Thr	Asp	Gly	Lys	Gly	Asn	Tyr
			260					265					270		
Asn	Arg	Arg	Asn	Ser	Val	Arg	Leu	Met	Thr	Phe	Tyr	Arg	Lys	Val	Ser
	275						280					285			
Asp	Pro	Ile	Glu	Leu	Thr	Thr	Lys	Thr	Ile	Gly	Ala	Lys	Leu	Glu	Glu
	290					295					300				
Val	Trp	Glu	Gln	Ala	Lys	Lys	Asp	Trp	Asp	Trp	Gly	Val	Asp	Leu	Gln
305					310					315					320
Gly	Ala	Ile	His	Arg	Ala	Arg	Asp	Ile	Phe	Arg	Gly	Glu	Lys	Gly	Ser
			325						330					335	
Lys	Gly	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	Thr	Phe
			340					345					350		
Ser	Tyr	Asp	Ile	Ser	Asp	Lys	Asp	Asn	Gly	Ala	Ser	Val	Arg	Val	Pro
	355						360					365			
Ser	Ile	Thr	Gly	Asn	Val	Thr	Ala	Ser	Asn	Pro	Leu	Phe	Pro	Trp	Leu
	370					375					380				
Pro	Ile	Phe	Pro	Pro	Thr	Pro	His	Pro	Ala	Glu	Val	Ile	Asp	Asp	Val
385					390					395					400
Asp	Lys	Leu	Leu	Gly	Phe	Ala	Glu	Asn	Leu	Gly	Ile	Ser	Leu	Pro	Lys
			405					410					415		
Gly	Leu	Arg	Glu	Gly	Val	Thr	Ala	Ile	Gly	Leu	Arg	Arg	Gly	Leu	Leu
			420				425						430		
Ser	Ser	Phe	Thr	Gly	Ser	Gly	Leu	Thr	Glu	Tyr	Leu	Thr	Leu	Ser	Glu
	435					440					445				
Tyr	Gly	Ser	Ala	Ile	Leu	Tyr	Tyr	Ala	Gln	Phe	Asp	Tyr	Thr	Thr	Arg
	450					455				460					
Val	Gly	Glu	Gly	Tyr	Tyr	Tyr	His	Ser	Tyr	Ser	Val	Arg	Thr	His	Gly
465					470					475					480
Asp	Met	Leu	Pro	Phe	Glu	Ser	Glu	Ile	Arg	Lys	Ala	Leu	Glu	Gln	Val
			485					490					495		
Leu	Pro	Lys	Ile	Glu	Asp	Arg	Glu	Trp	Ala	Pro	Met	Phe	Ile	Asp	Ile
		500					505					510			
Phe	Gly	Leu	Pro	Ile	Gln	Lys	Val	Asn	Gln	Ser	Gly	Ile	Asp	Val	Ile
	515					520					525				
Met	Lys	Val	Ile	Asn	Ser	Ile	Phe	Tyr	Ser	Arg	Gln	Tyr	Phe	Tyr	Tyr
	530					535				540					
Asn	Arg	Asn	Leu	Ser	Ala	Ile	Ala	Glu	Ala	Lys	Met	Ala	Gln	Glu	Glu
545					550					555					560
Gly	Ile	Thr	Phe	Tyr	Ser	Val	Asp	Val	Thr	Asp	Leu	Ser	Ser	Ala	Ser
			565					570					575		
Lys	Arg	Ala	Lys	Arg	Gln	Thr	Ala	Val	Pro	Gln	Lys	Thr	Thr	Lys	Lys
		580					585						590		
Glu	Ser	Glu	Glu	Asp	Arg	Asn	Asn	Lys	Phe	Asp	Gly	Tyr	Leu	Lys	Lys
		595				600					605				
Met	Ser	Glu	Gly	Gly	Lys	Glu	Phe	Phe	Thr	Gly	Val	Asp	Lys	Ala	Asp
	610					615				620					
Lys	Phe	Lys	Asp	Thr	Leu	Thr	Glu	Leu	Thr	Ile	Lys	Asp	Glu	Phe	Glu
625					630					635					640

Asp Lys Val Thr Val Glu Thr Asn Ser Glu Gly Lys Lys Asn Tyr Lys  
 645 650 655  
 Thr Asn Leu Lys Gly Asn Thr Leu Lys Val Asn His Thr Pro Ser Lys  
 660 665 670  
 Ala Gly Ser Leu Ser Trp Phe Ser Ser Ala Thr Lys Glu Ser Leu Thr  
 675 680 685  
 Trp Thr Ile Ser Lys Asp Leu Gly Arg Lys Lys Ala Phe Glu Asp Gly  
 690 695 700  
 Lys Pro Leu Thr Leu Thr Tyr Lys Leu Lys Val Asp Asn Gly Lys Phe  
 705 710 715 720  
 Lys Lys Ser Leu Glu Asn Asn Lys Lys Arg Thr Lys Arg Ser Ala  
 725 730 735  
 Pro Thr Glu Asn Glu Asn Ser Ile Lys Glu Lys Ile Ile Ser Asn Thr  
 740 745 750  
 Ile Thr Tyr Lys Ile Asn Asn Gln Lys Gly Gln Thr Gly Lys Lys Leu  
 755 760 765  
 Asp Asp Val Ser Leu Thr Tyr Ser Lys Leu Lys Val Pro Val Pro Gln  
 770 775 780  
 Ile Asp Glu Lys Val Ile Glu Gln Gln Glu Pro Thr Leu Pro Lys Leu  
 785 790 795 800  
 Pro Pro Val Ile Glu His Gly Pro Asn Phe Glu Tyr Glu Glu Glu Thr  
 805 810 815  
 Gly Tyr Gln Leu Pro Leu Lys His Gly Arg Asn Ala Pro Asp Thr Gln  
 820 825 830  
 Val Thr Ile Glu Glu Asp Thr Val Pro Gln Arg Pro Asp Ile Leu Val  
 835 840 845  
 Gly Gly Gln Ser Asp Pro Ile Asp Ile Thr Glu Asp Thr Gln Pro Gly  
 850 855 860  
 Met Ser Gly Ser Asn Asp Ala Thr Val Val Glu Glu Asp Thr Ala Pro  
 865 870 875 880  
 Lys Arg Pro Asp Val Leu Val Gly Gly Gln Ser Glu Pro Ile Asp Ile  
 885 890 895  
 Thr Glu Asp Thr Gln Pro Ser Val Ser Gly Ser Asn Asp Ala Thr Val  
 900 905 910  
 Val Glu Glu Asp Thr Val Pro Lys Arg Pro Asp Ile Leu Val Gly Gly  
 915 920 925  
 Gln Ser Asp Gln Ile Asp Ile Thr Glu Asp Thr Gln Pro Gly Met Ser  
 930 935 940  
 Gly Ser Asn Asp Ala Thr Val Ile Glu Glu Asp Thr Lys Pro Lys Arg  
 945 950 955 960  
 Phe Phe His Phe Asp Asn Glu Pro Gln Ala Pro Leu Lys Pro Tyr Glu  
 965 970 975  
 Gln Pro Ser Leu Ser Leu Pro Gln Ala Pro Val Tyr Lys Ala Ala His  
 980 985 990  
 His Leu Pro Ala Ser Gly Asp Lys Arg Glu Ala Thr Ile Thr Ile Val  
 995 1000 1005  
 Ala Leu Thr Leu Ile Gly Ala Ala Gly Leu Leu Ser Lys Lys Arg Arg  
 1010 1015 1020  
 Asp Thr Glu Glu Asn  
 1025

<210> 40

<211> 258

<212> PRT

<213> Streptococcus pyogenes

<400> 40

Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Thr Gly Ala Ser Ser  
1 5 10 15  
Ser Thr Glu Thr Ser Ala Ser Ser Asn Asn Thr Asn Thr Ala Ser Thr  
20 25 30  
Val Glu Thr Ser Thr Thr Thr Ser Thr Ser Gly Thr Ala Ala Ser Gly  
35 40 45  
Thr Gly Ser Glu Ala Ala Val Ala Ser Ser Gly Gly Ser Gln Ser Ser  
50 55 60  
Gly Thr Thr Pro Ala Ser Pro Gln Ala Gln Thr Ser Glu Gln Pro Ala  
65 70 75 80  
Val Thr Ser Ala Ser Ser Thr Ser Ser Ser Ser Glu Glu Lys Thr Pro  
85 90 95  
Lys Ala Ala Asn Thr Ala Ser Ser Ser Ala Thr Val Ala Ser Pro Ser  
100 105 110  
Asn Gly Ser Asn Gln Glu Ala Ser Ala Glu Thr Glu Pro Gln Thr Met  
115 120 125  
Glu Val Glu Lys Tyr Thr Val Asp Arg Glu Asn Ser Glu Leu Lys Val  
130 135 140  
Lys Asp Gly Thr Gln Pro Lys Lys Gly Arg Ser Val Ser Gln Asp Thr  
145 150 155 160  
Lys Leu Ile Lys Asn Arg Asp Gly Lys Gln Arg Asp Ile Val Asp Val  
165 170 175  
Thr Arg Thr Val Lys Thr Asn Glu Asp Gly Thr Ile Asp Val Thr Val  
180 185 190  
Thr Val Lys Pro Lys Gln Ile Asp Glu Gly Ala Asp Val Met Ala Leu  
195 200 205  
Leu Asp Val Ser Lys Lys Met Thr Glu Asp Asp Phe Lys Asn Ala Lys  
210 215 220  
Glu Lys Ile Lys Lys Leu Val Thr Thr Leu Thr Ser Lys Ser Pro Asp  
225 230 235 240  
Gly Gln Pro Asn His Asn Ala Arg Asn Ser Val Arg Leu Met Thr Phe  
245 250 255

Tyr His

<210> 41

<211> 216

<212> PRT

<213> Streptococcus pyogenes

<400> 41

Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Thr Thr Ser Thr Ala  
1 5 10 15  
Ser Thr Glu Thr Ser Ala Ser Ser Thr Ala Ser Ala Ser Thr Asp Thr  
20 25 30  
Ala Thr Thr Ser Val Thr Ala Ala Thr Thr Pro Ser Thr Thr Thr Gly  
35 40 45  
Thr Ser Val Thr Ala Ala Asn Gly Thr Ser Ser Gly Thr Thr Val Ala  
50 55 60  
Thr Ala Thr Thr Thr Asn Gly Gly Thr Gln Ser Thr Pro Ala Ala Ala  
65 70 75 80  
Glu Thr Thr Pro Lys Pro Gln Ala Gln Thr Ala Val Ala Thr Ser Ser  
85 90 95  
Ser Ser Ser Asn Ala Asn Pro Leu Ser Glu Thr Gln Ala Ser Lys Ala  
100 105 110  
Ala Ser Thr Thr Ser Ser Ser Ala Thr Val Ala Ser Ser Ser Asn Gly

		115					120					125					
Ser	Asn	Gln	Gly	Ala	Gly	Thr	Glu	Ala	Glu	Pro	Gln	Met	Met	Asp	Val		
	130					135					140						
Glu	Lys	Tyr	Thr	Val	Asp	Lys	Glu	Asn	Ser	Glu	Leu	Lys	Val	Lys	Asp		
145					150					155					160		
Gly	Lys	Glu	Thr	Asn	Gly	Ser	Gly	Val	Asn	Lys	Lys	Leu	Ile	Arg	Asn		
				165					170					175			
Arg	Asp	Gly	Glu	Gln	Arg	Asp	Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys		
			180					185					190				
Thr	Asn	Ser	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Thr	Pro	Lys		
	195						200					205					
Glu	Ile	Asp	Glu	Gly	Ala	Asp	Val										
	210					215											

<210> 42

<211> 235

<212> PRT

<213> Streptococcus pyogenes

<400> 42

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Ala	Ser	Thr	Thr	Ser		
1				5				10						15			
Thr	Glu	Thr	Ser	Ala	Thr	Ser	Thr	Asn	Thr	Ser	Thr	Ala	Ser	Ala	Gly		
			20					25					30				
Thr	Ser	Thr	Ser	Gly	Thr	Ala	Thr	Thr	Thr	Ser	Ser	Ala	Thr	Thr	Asp		
		35				40						45					
Ala	Gly	Arg	Ala	Ala	Gly	Ser	Gly	Thr	Ala	Ser	Gly	Thr	Asn	Gly	Val		
50					55						60						
Ser	Ser	Val	Ala	Ser	Ser	Glu	Gly	Ser	Gln	Gly	Ser	Glu	Pro	Gly	Gln		
65				70				75						80			
Ala	Ser	Thr	Gln	Pro	Gln	Ala	Gln	Thr	Leu	Glu	Gln	Ser	Ala	Ala	Thr		
			85					90						95			
Ser	Thr	Ser	Ser	Ala	Ser	Ser	Ser	Asn	Glu	Glu	Lys	Ser	Ile	Lys	Ser		
			100					105					110				
Ala	Thr	Ser	Ser	Thr	Pro	Ser	Thr	Ala	Ala	Ala	Ser	Ser	Ser	Ser	Asn		
		115					120					125					
Gly	Asn	Gln	Glu	Ala	Ser	Ala	Gly	Thr	Ala	Pro	Gln	Met	Met	Glu	Val		
130						135					140						
Glu	Arg	Tyr	Thr	Val	Asp	Lys	Glu	Asn	Ser	Glu	Leu	Lys	Val	Lys	Asp		
145					150					155					160		
Gly	Asp	Lys	Leu	Lys	Asn	Gly	Gly	Ser	Ala	Thr	Lys	Glu	Thr	Lys	Leu		
				165				170						175			
Ile	Arg	Asn	Arg	Asp	Gly	Lys	Gln	Arg	Asp	Ile	Val	Asp	Val	Thr	Arg		
			180					185					190				
Thr	Val	Lys	Thr	Asn	Glu	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val		
	195					200						205					
Lys	Pro	Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp		
210					215						220						
Val	Ser	Gln	Lys	Met	Thr	Lys	Glu	Asn	Phe	Asp							
225					230					235							

<210> 43

<211> 865

<212> PRT

<213> Streptococcus pyogenes

<400> 43

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Asn	Ala	Ser	Thr	Thr	Ser	1	5	10	15
Ser	Thr	Glu	Thr	Ser	Ala	Ser	Ser	Ala	Ala	Ser	Val	Ser	Ala	Gly	Thr	20	25	30	
Gly	Thr	Ser	Gly	Thr	Ala	Ala	Arg	Glu	Ala	Gly	Ser	Gly	Ala	Ser	Asp	35	40	45	
Glu	Ser	Ser	Asp	Ala	Ser	Val	Ala	Ser	Ser	Glu	Gly	Ser	Gln	Gly	Ser	50	55	60	
Lys	Phe	Ala	Pro	Ala	Ser	Pro	Gln	Pro	Gln	Ala	Gln	Thr	Ala	Thr	Val	65	70	75	80
Ala	Ser	Ala	Ser	Thr	Thr	Ala	Ser	Pro	Ser	Ser	Ser	Ser	Ala	Ser	Asp	85	90	95	
Gly	Lys	Ala	Pro	Gln	Ala	Ala	Ser	Thr	Lys	Ser	Ser	Ser	Ala	Ser	Val	100	105	110	
Ala	Ser	Ser	Ser	Asn	Gly	Ser	Asn	Gln	Gly	Ala	Gly	Ala	Glu	Asp	Ala	115	120	125	
Pro	Gln	Met	Met	Asp	Val	Glu	Gln	Tyr	Thr	Val	Asp	Lys	Glu	Ser	Ser	130	135	140	
Glu	Leu	Lys	Val	Lys	Asp	Gly	Lys	Asn	Pro	Lys	Asn	Gly	Ser	Arg	Ala	145	150	155	160
Asp	Lys	Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Asp	Glu	Gln	Arg	Asp	165	170	175	
Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Asp	Asn	Gly	Asp	Gly	Thr	Leu	180	185	190	
Asp	Val	Thr	Leu	Lys	Val	Thr	Pro	Lys	Glu	Ile	Asp	Glu	Gly	Ala	Asp	195	200	205	
Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Gln	Lys	Met	Thr	Asp	Ala	Asp	Phe	210	215	220	
Lys	Asn	Ala	Lys	Asp	Lys	Ile	Lys	Lys	Leu	Val	Thr	Thr	Leu	Thr	Ser	225	230	235	240
Lys	Ser	Asn	Ser	Asp	Glu	His	Lys	His	Asn	Ser	Arg	Asn	Ser	Val	Arg	245	250	255	
Leu	Met	Thr	Phe	Tyr	Arg	Glu	Ile	Ser	Asp	Pro	Ile	Asp	Ile	Ser	Gly	260	265	270	
Lys	Thr	Glu	Ala	Glu	Leu	Asp	Gln	Leu	Leu	Asn	Glu	Leu	Arg	Glu	Lys	275	280	285	
Ala	Lys	Ala	Asn	Tyr	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	Ala	Ile	His	290	295	300	
Lys	Thr	Arg	Glu	Ile	Phe	Asn	Lys	Glu	Gln	Lys	Ser	Lys	Lys	Arg	Gln	305	310	315	320
His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	Thr	Phe	Ser	Tyr	Asp	Ile	325	330	335	
Gln	Lys	Ser	Glu	Lys	Glu	Lys	Asp	Ser	Asn	Leu	Ser	Arg	Ile	Asn	Glu	340	345	350	
Lys	Ile	Thr	Ser	Ser	Asn	Pro	Leu	Leu	Pro	Trp	Pro	Pro	Ile	Phe	Asp	355	360	365	
His	Thr	His	Gln	Asn	Ala	Asp	Met	Leu	Lys	Asp	Val	Glu	Phe	Leu	Ile	370	375	380	
Ser	Leu	Ala	Gln	Lys	Leu	Gly	Val	Thr	Gly	Leu	Ser	Ser	Ile	Lys	Thr	385	390	395	400
Ile	Leu	Gln	Gly	Val	Gly	Leu	Ala	Asn	Gln	Phe	Gly	Gly	Leu	Leu	Leu	405	410	415	
Gly	Gly	Gly	Ser	Leu	Thr	Glu	Tyr	Leu	Thr	Leu	Gln	Glu	Tyr	Lys	Thr	420	425	430	
Asn	Thr	Phe	Thr	Lys	Glu	Gln	Phe	Asp	Tyr	Thr	Lys	Arg	Val	Gly	Glu	435	440	445	
Gly	Tyr	His	Tyr	His	Ser	Phe	Ser	Thr	Arg	Lys	Ser	Glu	Asp	Lys	Ile				

450		455		460	
Pro Phe Glu Lys Asp Ile Glu Ala Ala Leu Lys Thr Ala Leu Pro Glu					
465		470		475	480
Ser Lys Ser Glu Asn Trp Phe Thr Lys Val Leu Thr Tyr Phe Gly Leu					
	485		490		495
Lys Asn Lys Ala Glu Gln Ala Lys Leu Asp Val Ile Met Lys Val Ile					
	500		505		510
Lys Ser Val Phe Tyr Lys Arg Gln Tyr His Tyr Tyr Asn His Asn Leu					
	515		520		525
Ser Ala Ile Ala Glu Ala Lys Met Ala Gln Lys Asp Gly Ile Thr Phe					
	530		535		540
Tyr Ser Val Asp Val Thr Asp Ser Asp Asn Ala Ser Lys Arg Val Lys					
545		550		555	560
Arg Gln Val Gly Lys Glu Gln Ser Lys Lys Lys Glu Asp Ala Gly					
	565		570		575
Lys Asp Arg Ser Lys Lys Phe Asp Asp Tyr Leu Lys Lys Met Ser Glu					
	580		585		590
Gly Asp Asn Phe Leu Ser Asn Val Glu Glu Arg Asp Lys Phe Lys Asp					
	595		600		605
Thr Leu Thr Glu Leu Thr Val Lys Asp Glu Phe Ser Asp Lys Val Thr					
	610		615		620
Val Gln Asn Asn Ser Glu Gly Lys Lys Tyr Gln Val Thr Gly Leu Ile					
625		630		635	640
Asn Asp Ile Lys Val Ser Tyr Thr Ala Ala Asn Asn Thr Gly Trp Phe					
	645		650		655
Thr Arg Thr Lys Glu Ser Leu Thr Trp Thr Ile Ser Lys Glu Gln Leu					
	660		665		670
Lys Lys Ala Phe Glu Asp Gly Lys Pro Leu Thr Leu Thr Tyr Lys Leu					
	675		680		685
Lys Val Asp Asn Asp Lys Leu Lys Lys Ala Leu Asp Asp Lys Arg Lys					
	690		695		700
Asp Arg Lys Lys Arg Asp Thr Ser Thr Lys Asn Glu Asn Ser Val Thr					
705		710		715	720
Glu Arg Ile Ile Ser Asn Ile Thr Thr Tyr Lys Ile Asn Gly Gln Glu					
	725		730		735
Val Lys Asp Asn Asn Leu Ser Asp Val Ser Leu Thr Tyr Ser Lys Leu					
	740		745		750
Lys Val Pro Val Pro Gln Ile Asp Gly His Val Ile Glu Pro Gln Ala					
	755		760		765
Pro Thr Leu Pro Lys Leu Pro Pro Val Thr Glu Arg Gly Pro Val Leu					
	770		775		780
Asp Tyr Thr Glu Glu Ser Ile Tyr Arg Leu Pro Leu Glu His Gly Ser					
785		790		795	800
Asn Ala Pro Asp Thr Gln Val Thr Ile Glu Glu Asp Thr Val Pro Gln					
	805		810		815
Arg Pro Asp Ile Leu Val Gly Gly Gln Ser Gly Pro Val Asp Ile Thr					
	820		825		830
Glu Asp Thr Gln Pro Gly Met Ser Gly Ser Asn Asp Ala Thr Val Val					
	835		840		845
Glu Glu Asp Thr Ala Pro Gln Arg Pro Asp Val Leu Val Gly Gly Gln					
	850		855		860
Ser					
865					

<210> 44  
 <211> 214  
 <212> PRT

<213> Streptococcus pyogenes

<400> 44

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Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Ala Gly Ala Ser Ser
 1          5          10          15
Ser Thr Glu Thr Ser Ala Ala Ser Ala Ser Ala Gly Thr Ser Thr Ser
          20          25          30
Glu Thr Ala Ala Ser Gly Thr Gly Ser Glu Ala Ala Val Val Ser Ser
          35          40          45
Glu Gly Ser Gln Ser Ser Glu Ser Ala Gln Ala Ser Pro Gln Pro Gln
          50          55          60
Pro Gln Ala Gln Thr Val Thr Ala Thr Thr Ser Thr Ser Thr Ser
65          70          75          80
Ser Ser Ser Asp Gly Lys Ser Thr Lys Ser Ala Thr Ser Ser Thr Ser
          85          90          95
Ser Ala Phe Ser Thr Ser Ser Ser Glu Asp Lys Ala Pro Lys Ala Ala
          100          105          110
Ser Thr Lys Ser Ser Ser Thr Thr Val Ala Ser Pro Ser Asn Gly Ser
          115          120          125
Asn Gln Gly Ala Ser Thr Glu Thr Glu Pro Gln Met Met Glu Val Glu
          130          135          140
Gln Tyr Lys Val Asp Lys Glu Glu Thr Glu Leu Lys Val Lys Asp Gly
145          150          155          160
Ser Lys Leu Asn Ser Ser Ser Asp Lys Lys Leu Ile Arg Asn Arg Asp
          165          170          175
Gly Glu Gln Arg Asp Ile Phe Asp Ile Lys Arg Glu Val Lys Thr Asn
          180          185          190
Ser Asp Gly Thr Ile Asp Val Thr Val Thr Val Thr Pro Lys Glu Ile
          195          200          205
Asp Glu Gly Ala Asp Val
          210
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<210> 45

<211> 1013

<212> PRT

<213> Streptococcus pyogenes

<400> 45

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Met Thr Asn Cys Lys Tyr Lys Leu Arg Lys Leu Ser Val Gly Leu Val
 1          5          10          15
Ser Val Gly Thr Met Leu Ile Ala Pro Thr Val Leu Gly Gln Glu Val
          20          25          30
Ser Thr Thr Gly Ser Thr Glu Thr Ser Ala Ala Ser Thr Thr Ser
          35          40          45
Thr Ala Ser Thr Val Glu Thr Ser Thr Thr Thr Gly Thr Ser Val Thr
          50          55          60
Ala Ala Ser Glu Ala Ser Ser Glu Ser Ser Asp Val Ser Val Val Ser
65          70          75          80
Ser Glu Gly Ser Gln Ser Ser Ala Ser Ala Pro Ala Ser Pro Gln Pro
          85          90          95
Gln Ala Gln Thr Pro Pro Ala Ala Thr Ser Thr Ser Ser Ala Ser Ser
          100          105          110
Ser Ser Ser Glu Asp Lys Ala Ser Lys Ala Ala Thr Ser Ser Thr Ser
          115          120          125
Ser Ser Thr Pro Ala Val Ala Ser Ser Ser Ser Asn Ser Asn Gln Ala
          130          135          140
Thr Gly Thr Glu Val Glu Pro Gln Met Met Glu Val Glu Gln Tyr Thr
```

145					150					155					160
Val	Asn	Lys	Glu	Ser	Ser	Glu	Leu	Lys	Val	Lys	Asp	Gly	Lys	Glu	Met
				165					170					175	
Asn	Gly	Ser	Gly	Val	Ser	Lys	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Glu
			180					185					190		
Gln	Arg	Asp	Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Thr	Asn	Ala	Asp
		195					200					205			
Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Thr	Pro	Lys	Glu	Ile	Asp	Lys
	210					215				220					
Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Lys	Lys	Met	Ser	Lys
225					230				235						240
Glu	Asp	Phe	Asn	Asn	Ala	Lys	Thr	Lys	Ile	Lys	Gln	Leu	Val	Lys	Thr
				245					250					255	
Leu	Thr	Glu	Lys	Asn	Gly	Glu	Asn	His	Asn	Ser	Arg	Asn	Ser	Val	Arg
			260					265						270	
Leu	Met	Thr	Phe	Tyr	Arg	Glu	Ile	Ser	Asp	Pro	Ile	Asp	Ile	Ser	Gly
	275						280					285			
Lys	Thr	Glu	Glu	Gln	Leu	Asp	Lys	Ile	Leu	Asn	Asp	Leu	Arg	Lys	Lys
	290					295					300				
Ala	Lys	Ala	Asn	Tyr	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	Ala	Ile	His
305					310				315						320
Lys	Ala	Arg	Glu	Ile	Phe	Lys	Arg	Asp	Gln	Glu	Lys	Lys	Ser	Gly	Lys
				325					330					335	
Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	Thr	Phe	Ser	Tyr
			340					345					350		
Asp	Ile	Lys	Asn	Lys	Asn	Asp	Ser	Thr	Val	Thr	Lys	Thr	Arg	Ile	Thr
	355					360						365			
Glu	Lys	Val	Thr	Thr	Ser	Asn	Pro	Leu	Leu	Pro	Trp	Pro	Pro	Ile	Phe
	370					375					380				
Asp	His	Thr	His	Gln	Asn	Ala	Asp	Met	Leu	Glu	Asp	Ser	Ala	Lys	Leu
385					390				395						400
Ile	Lys	Lys	Leu	Lys	Ser	Leu	Gly	Leu	Glu	Ser	Leu	Gln	Thr	Ala	Asp
				405					410					415	
Asn	Ile	Leu	Gln	Ala	Leu	Gln	Ala	Ala	Asn	Arg	Ile	Gly	Ser	Leu	Phe
			420					425					430		
Gly	Lys	Ser	Pro	Thr	Glu	Tyr	Leu	Thr	Leu	Asn	Glu	Tyr	Asp	Ser	Asn
		435					440					445			
Lys	Leu	Gly	Glu	Glu	Ser	Phe	Asp	Tyr	Ser	Lys	His	Val	Gly	Glu	Gly
	450					455					460				
Tyr	Tyr	Tyr	His	Ser	Phe	Ser	Asp	Arg	Lys	Ser	Glu	Asn	Thr	Met	Pro
465					470				475						480
Leu	Glu	Ser	Ala	Ile	Lys	Thr	Ala	Leu	Thr	Ser	Asn	Phe	Pro	Lys	Ile
				485					490					495	
Pro	Asp	Ser	Trp	Phe	Phe	Gly	Ile	Leu	Lys	Ser	Ser	Asp	Ile	Lys	Ala
			500					505					510		
Lys	Val	Glu	Lys	Ala	Lys	Leu	Asp	Val	Ile	Met	Gln	Val	Leu	Lys	Ser
		515					520					525			
Ile	Phe	Tyr	Lys	Arg	Glu	Tyr	Arg	Tyr	Tyr	Asn	His	Asn	Leu	Ser	Ala
	530					535					540				
Ile	Ala	Glu	Ala	Lys	Met	Ala	Gln	Lys	Asp	Gly	Ile	Thr	Phe	Tyr	Ser
545					550				555						560
Val	Asp	Val	Thr	Ser	Pro	Asn	Gln	Pro	Ala	Thr	Thr	Lys	Arg	Ser	Arg
				565					570					575	
Arg	Ser	Thr	Glu	Lys	Lys	Glu	Ala	Glu	Glu	Arg	Asn	Glu	Lys	Phe	Asp
			580					585				590			
Lys	Tyr	Leu	Lys	Glu	Met	Ser	Glu	Gly	Gly	Lys	Lys	Phe	Phe	Asn	Asp



<400> 46

<210> 47

<211> 256

<212> PRT

<400> 47

43

Ile	Arg	Arg	Asp	Gly	Asp	Glu	Lys	Thr	Arg	Asp	Leu	Tyr	Asp	Val	Lys
				165						170				175	
Arg	Glu	Val	Lys	Asp	Asn	Gly	Asp	Gly	Thr	Leu	Asp	Val	Thr	Leu	Lys
			180					185					190		
Val	Thr	Pro	Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu
		195					200					205			
Asp	Val	Ser	Lys	Lys	Met	Thr	Glu	Thr	Asp	Phe	Lys	Asn	Ala	Lys	Glu
	210					215					220				
Lys	Ile	Lys	Lys	Leu	Val	Thr	Thr	Leu	Thr	Ser	Lys	Ser	Thr	Asp	Asn
225					230					235				240	
Gln	Pro	Asn	His	Asn	Ala	Arg	Asn	Ser	Val	Arg	Leu	Met	Thr	Phe	Tyr
				245					250					255	

<210> 48

<211> 208

<212> PRT

<213> Streptococcus pyogenes

<400> 48

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Ser	Thr	Gly	Thr	Ala	Ser
1				5					10					15	
Thr	Glu	Thr	Ser	Ala	Ser	Ser	Thr	Asn	Ser	Asn	Asn	Thr	Ala	Ser	Ala
			20					25					30		
Asp	Ala	Thr	Ala	Ser	Gly	Thr	Ala	Ala	Ser	Gly	Thr	Ala	Ser	Gly	Thr
		35				40						45			
Asn	Gly	Ala	Phe	Ser	Val	Thr	Ser	Ser	Glu	Gly	Ser	Gln	Ser	Ser	Glu
	50					55					60				
Ser	Ala	Pro	Ala	Ser	Lys	Gln	Pro	Gln	Ala	Val	Val	Ser	Thr	Ala	Ala
65					70					75				80	
Thr	Ser	Ala	Ser	Thr	Ala	Ser	Ser	Ser	Ser	Ser	Glu	Glu	Lys	Thr	Pro
			85						90					95	
Lys	Ala	Ala	Thr	Ala	Ser	Thr	Thr	Ala	Ser	Ser	Thr	Pro	Ala	Thr	Ser
			100					105					110		
Ser	Ser	Asn	Asp	Gly	Asn	Asn	Gln	Gly	Ala	Ser	Thr	Glu	Val	Glu	Thr
		115					120					125			
Pro	Met	Met	Glu	Val	Glu	Gln	Tyr	Lys	Val	Asn	Lys	Glu	Lys	Thr	Glu
	130					135					140				
Leu	Thr	Val	Lys	Asp	Gly	Thr	Gln	Pro	Lys	Asn	Gly	Lys	Thr	Ala	Asn
145					150					155				160	
Gln	Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Glu	Gln	Arg	Asp	Ile
			165						170					175	
Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Thr	Asn	Ala	Asp	Gly	Thr	Ile	Asp
		180						185					190		
Val	Thr	Val	Thr	Val	Thr	Pro	Lys	Glu	Ile	Asp	Glu	Gly	Ala	Asp	Val
		195					200					205			

<210> 49

<211> 221

<212> PRT

<213> Streptococcus pyogenes

<400> 49

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Asn	Ala	Ser	Thr	Glu	Thr
1				5					10					15	
Ser	Ala	Ser	Ser	Thr	Thr	Ser	Thr	Ala	Ser	Thr	Ala	Glu	Thr	Ser	Thr
			20					25					30		
Pro	Thr	Gly	Thr	Ser	Gly	Thr	Ala	Ala	Ser	Gly	Ala	Ser	Gly	Glu	Ala



<210> 51  
 <211> 447  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 51

Ile	Ala	Pro	Thr	Ile	Leu	Gly	Gln	Glu	Val	Ser	Ala	Ser	Thr	Glu	Thr
1				5				10						15	
Ser	Thr	Thr	Ser	Thr	Ser	Thr	Ala	Ser	Val	Asp	Ala	Thr	Thr	Ser	Gly
			20					25					30		
Thr	Ala	Ala	Thr	Thr	Pro	Ser	Ala	Ser	Thr	Ser	Thr	Gly	Gly	Thr	Ala
		35					40					45			
Ala	Ser	Gly	Ala	Ser	Gly	Glu	Ala	Thr	Val	Ala	Thr	Ala	Asn	Gly	Gly
	50					55					60				
Pro	Gln	Ser	Ala	Pro	Ala	Thr	Ser	Glu	Ala	Thr	Pro	Gln	Pro	Gln	Ala
65					70					75					80
Gln	Thr	Ala	Thr	Val	Val	Ser	Ala	Ser	Thr	Thr	Ala	Ser	Pro	Ser	Ser
				85					90					95	
Ala	Ser	Asp	Val	Lys	Ala	Pro	Gln	Ala	Ala	Ser	Thr	Thr	Ser	Ala	Ser
			100					105					110		
Ser	Thr	Pro	Ala	Ala	Ala	Ser	Asn	Asn	Ser	Asn	Gln	Ala	Thr	Gly	Thr
		115					120					125			
Glu	Val	Glu	Thr	Pro	Met	Met	Glu	Val	Glu	Gln	Tyr	Lys	Val	Asp	Lys
	130					135					140				
Glu	Lys	Thr	Glu	Leu	Lys	Val	Lys	Asp	Gly	Asn	Lys	Leu	Asn	Ser	Ser
145					150					155					160
Gly	Ser	Asp	Lys	Gln	Leu	Ile	Arg	Asn	Arg	Asp	Gly	Lys	Gln	Arg	Asp
				165					170					175	
Ile	Val	Asp	Val	Thr	Arg	Thr	Val	Lys	Thr	Asn	Glu	Asp	Gly	Thr	Ile
			180					185					190		
Asp	Val	Thr	Val	Thr	Val	Lys	Pro	Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp
		195					200					205			

  

Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Lys	Lys	Met	Ser	Glu	Asp	Asp	Phe
	210					215					220				
Lys	Asn	Ala	Lys	Glu	Lys	Ile	Lys	Thr	Leu	Val	Thr	Thr	Leu	Thr	Gly
225					230					235					240
Lys	Ser	Ser	Asp	Gly	Lys	Glu	Asn	Leu	Asn	Asn	Arg	Asn	Thr	Val	Arg
				245					250					255	
Leu	Met	Thr	Phe	Tyr	Arg	Lys	Ile	Ser	Glu	Pro	Ile	Asp	Leu	Ser	Gly
			260					265					270		
Lys	Thr	Ser	Glu	Glu	Val	Glu	Lys	Glu	Leu	Asp	Asn	Ile	Trp	Asp	Lys
		275					280					285			
Val	Lys	Lys	Glu	Asp	Trp	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	Ala	Ile
	290					295					300				
His	Arg	Ala	Arg	Asp	Ile	Phe	Lys	Lys	Asp	Gln	Glu	Lys	Lys	Ser	Gly
305					310					315					320
Lys	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	Glu	Ser	Thr	Phe	Ser
				325					330					335	
Tyr	Asp	Ile	His	Glu	Lys	Ser	Lys	Asn	Leu	Ser	Arg	Ile	Asn	Glu	Lys
			340					345					350		
Ile	Thr	Ser	Ser	Asn	Pro	Leu	Leu	His	Trp	Pro	Pro	Ile	Phe	Asn	His
		355					360					365			
Thr	His	Gln	Asn	Ala	Asp	Met	Leu	Asn	Glu	Ile	Asn	Ser	Ile	Val	Lys
	370					375					380				
Ile	Gly	Glu	Gln	Leu	Gly	Ile	Lys	Gly	Leu	Ser	Asn	Ile	Arg	Asp	Ile
385					390					395					400

Leu Thr Ala Ala Gly Val Gly Ser Gly Leu Leu Gly Ser Val Val Gly  
                     405                    410                    415  
 Gly Gly Ser Leu Thr Glu Tyr Leu Thr Leu Lys Glu Tyr Lys Ser Asp  
                     420                    425                    430  
 Lys Leu Leu Glu Glu Ser Gln Phe Asp Tyr Thr Gln Thr Cys Gly  
                     435                    440                    445

<210> 52

<211> 247

<212> PRT

<213> Streptococcus pyogenes

<400> 52

Ile Ala Pro Thr Val Leu Gly Gln Glu Val Asn Ala Asn Ala Glu Thr  
 1                    5                    10                    15  
 Ser Thr Thr Pro Ala Thr Thr Thr Pro Ser Thr Ser Thr Ile Thr Ser  
                     20                    25                    30  
 Gly Thr Ala Ala Ser Val Thr Gly Asn Glu Ala Thr Val Ala Thr Ala  
                     35                    40                    45  
 Thr Thr Thr Asn Gly Gly Thr Gln Ser Val Thr Ala Thr Ser Glu Ala  
                     50                    55                    60  
 Thr Pro Gln Pro Gln Ala Gln Lys Ala Pro Ala Thr Thr Ser Thr Ser  
 65                    70                    75                    80  
 Ser Ala Ser Ser Ser Asn Glu Lys Ser Thr Thr Ala Ala Thr Ser Ser  
                     85                    90                    95  
 Thr Pro Ser Thr Ser Ser Ser Ser Glu Ala Asn Ser Asp Ala Lys Ser  
                     100                    105                    110  
 Asn Lys Val Ala Ala Thr Pro Pro Ser Ala Thr Val Ala Ser Pro Ser  
                     115                    120                    125  
 Asn Gly Ser Asn Gln Gly Thr Ser Ala Glu Thr Ala Pro Gln Met Met  
 130                    135                    140  
 Glu Val Glu Gln Tyr Lys Ile Lys Asp Glu Asn Ser Ser Ile Thr Val  
 145                    150                    155                    160  
 Ala Asp Lys Asp Lys Gln Leu Lys Ile Arg Arg Asp Ile Asp Asn Pro  
                     165                    170                    175  
 Lys Asp Lys Asp Leu Phe Asp Val Thr Arg Glu Val Lys Asp Asn Gly  
                     180                    185                    190  
 Asp Gly Thr Leu Asp Val Thr Leu Lys Val Thr Pro Lys Gln Ile Asp  
                     195                    200                    205  
 Glu Gly Ala Asp Val Met Ala Leu Leu Asp Val Ser Lys Lys Met Ser  
                     210                    215                    220  
 Glu Asp Asp Phe Lys Asn Ala Lys Glu Lys Ile Lys Lys Leu Val Thr  
 225                    230                    235                    240  
 Thr Leu Thr Ser Lys Ser Ala  
                     245

<210> 53

<211> 213

<212> PRT

<213> Streptococcus pyogenes

<400> 53

Ile Ala Pro Thr Val Leu Gly Gln Glu Val Ser Ala Thr Gly Ser Thr  
 1                    5                    10                    15  
 Glu Thr Ser Ala Ala Ser Thr Ala Ser Pro Gly Thr Thr Ala Asn Gly  
                     20                    25                    30

Thr	Ala	Asp	Thr	Thr	Pro	Ser	Ala	Thr	Thr	Gly	Thr	Gly	Glu	Ala	Ala	
		35					40					45				
Gly	Ser	Gly	Thr	Ser	Ser	Gly	Thr	Thr	Val	Ala	Thr	Ala	Thr	Thr	Thr	
	50					55					60					
Asn	Gly	Gly	Thr	Gln	Ser	Thr	Pro	Ala	Ala	Ala	Glu	Thr	Thr	Pro	Gln	
65					70					75					80	
Pro	Gln	Ala	Gln	Thr	Ala	Thr	Val	Ala	Ser	Ala	Ser	Thr	Thr	Ala	Ser	
				85					90					95		
Ser	Ser	Ser	Ser	Asp	Gly	Lys	Ala	Pro	Gln	Ala	Ala	Ser	Thr	Thr	Ser	
			100					105					110			
Ser	Ser	Thr	Pro	Ala	Ala	Ala	Ser	Asn	Asn	Ser	Asn	Gln	Glu	Ala	Ser	
		115					120					125				
Ala	Lys	Ala	Glu	Thr	Pro	Met	Met	Asp	Val	Glu	Gln	Tyr	Lys	Val	Asp	
	130					135					140					
Lys	Glu	Glu	Thr	Glu	Leu	Lys	Val	Lys	Asp	Gly	Asp	Lys	Ser	Lys	Asn	
145					150					155					160	
Gly	Arg	Thr	Val	Asn	Gln	Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	Asp	Gly	
				165					170					175		
Lys	Gln	Arg	Asp	Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Asp	Asn	Gly	
			180					185					190			
Asp	Gly	Thr	Leu	Asp	Val	Thr	Leu	Lys	Val	Thr	Pro	Lys	Gln	Ile	Asp	
		195					200					205				
Glu	Gly	Ala	Asp	Val												
	210															

<210> 54

<211> 430

<212> PRT

<213> Streptococcus pyogenes

<400> 54

Ile	Ala	Pro	Thr	Val	Leu	Gly	Gln	Glu	Val	Gly	Ala	Ser	Thr	Thr	Asn	
1				5					10					15		
Thr	Glu	Thr	Ser	Ala	Ser	Thr	Thr	Ser	Thr	Ala	Glu	Thr	Ser	Thr	Thr	
			20					25					30			
Thr	Gly	Thr	Ser	Gly	Thr	Ala	Ala	Ser	Glu	Thr	Gly	Ser	Gly	Thr	Ser	
		35				40					45					
Asp	Val	Ser	Val	Val	Ser	Ser	Glu	Gly	Ser	Gln	Gly	Ser	Glu	Ser	Ala	
	50				55					60						
Gln	Ala	Ser	Pro	Gln	Ala	Gln	Ala	Ala	Pro	Ala	Ala	Glu	Thr	Thr	Pro	
65				70						75					80	
Lys	Ala	Gln	Ala	Gln	Ala	Ala	Pro	Val	Ala	Ser	Ala	Ser	Thr	Thr	Ala	
				85					90					95		
Ser	Ser	Ala	Ser	Ser	Asn	Val	Lys	Thr	Pro	Lys	Thr	Glu	Ser	Ala	Thr	
			100					105					110			
Ile	Ser	Ser	Thr	Pro	Ala	Val	Ala	Ser	Ser	Asn	Gly	Ser	Asn	Gln	Glu	
		115					120					125				
Ala	Ser	Ala	Glu	Thr	Glu	Pro	Gln	Met	Met	Asp	Val	Glu	Gln	Tyr	Lys	
	130					135					140					
Val	Asn	Lys	Glu	Lys	Thr	Glu	Leu	Thr	Val	Lys	Asp	Gly	Thr	Gln	Pro	
145					150					155					160	
Lys	Asn	Gly	Arg	Thr	Val	Asn	Gln	Asn	Thr	Lys	Leu	Ile	Arg	Asn	Arg	
				165					170					175		
Asp	Gly	Glu	Gln	Arg	Asp	Ile	Phe	Asp	Ile	Lys	Arg	Glu	Val	Lys	Thr	
			180					185					190			
Asn	Ala	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Thr	Pro	Lys	Glu	
		195					200					205				

Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	Lys	Lys	
210						215					220					
Met	Thr	Glu	Glu	Asp	Phe	Lys	Asn	Ala	Lys	Asp	Lys	Ile	Lys	Lys	Leu	
225					230					235					240	
Val	Thr	Thr	Leu	Thr	Gly	Asp	Lys	Arg	Glu	Ala	Ser	Phe	Thr	Arg	Asn	
				245					250					255		
Ser	Val	Arg	Leu	Met	Thr	Phe	Tyr	Arg	Glu	Ile	Ser	Asp	Pro	Ile	Asp	
			260					265					270			
Ile	Ser	Gly	Lys	Thr	Asp	Asp	Glu	Leu	Asp	Lys	Leu	Leu	Asp	Lys	Leu	
		275				280						285				
Arg	Gln	Glu	Ala	Lys	Asp	Glu	Cys	Asp	Trp	Gly	Val	Asp	Leu	Gln	Gly	
	290				295						300					
Ala	Ile	His	Lys	Ala	Arg	Glu	Val	Phe	Asn	Asn	Glu	Asn	Asn	Asn	Ser	
305					310				315						320	
Lys	Lys	Lys	Ser	Gly	Lys	Arg	Gln	His	Ile	Val	Leu	Phe	Ser	Gln	Gly	
				325					330					335		
Glu	Ser	Thr	Phe	Ser	Tyr	Asp	Ile	Lys	Asn	Lys	Lys	Asp	Ser	Lys	Leu	
			340					345					350			
Gln	Lys	Asn	Arg	Leu	Thr	Thr	Val	Thr	Thr	Ser	Asn	Pro	Leu	Phe	Ser	
		355					360					365				
Trp	Phe	Pro	Ile	Phe	Asp	His	Thr	Asn	Arg	Lys	Ala	Asp	Met	Leu	Glu	
	370					375					380					
Asp	Phe	Asp	Lys	Leu	Leu	Ser	Ile	Ala	Gln	Lys	Phe	Gly	Ile	Glu	Ile	
385					390					395					400	
Pro	Lys	Glu	Val	Thr	Ala	Gly	Leu	Arg	Ala	Val	Thr	Thr	Ala	Asn	Ser	
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<210> 55

<211> 456

<212> PRT

<213> Streptococcus pyogenes

<400> 55

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			20					25					30			
Thr	Ala	Asp	Thr	Thr	Pro	Ser	Ala	Thr	Thr	Gly	Thr	Gly	Glu	Ala	Ala	
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Gly	Ser	Gly	Thr	Ser	Ser	Gly	Thr	Thr	Val	Ala	Thr	Ala	Thr	Thr	Thr	
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Asn	Gly	Gly	Thr	Gln	Ser	Thr	Thr	Ala	Ser	Glu	Thr	Thr	Pro	Gln	Pro	
65					70					75					80	
Gln	Ala	Gln	Thr	Ala	Val	Ala	Thr	Ser	Ser	Ser	Ser	Ser	Asn	Ala	Asn	
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Ala	Ser	Ser	Ser	Ser	Glu	Glu	Lys	Thr	Pro	Lys	Thr	Ala	Thr	Ser	Ser	
			100					105					110			
Thr	Ser	Ser	Thr	Ser	Ser	Thr	Pro	Ala	Ala	Ala	Ser	Asn	Asn	Ser	Asn	
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Gln	Glu	Ala	Ser	Ala	Glu	Thr	Glu	Pro	Gln	Met	Met	Asp	Val	Glu	Gln	
	130					135					140					
Tyr	Lys	Val	Asp	Lys	Glu	Glu	Thr	Glu	Leu	Lys	Val	Lys	Asp	Gly	Asp	
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Lys	Ser	Lys	Asn	Gly	Arg	Thr	Val	Asp	Gln	Asn	Thr	Lys	Leu	Ile	Arg	
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Asn	Arg	Asp	Gly	Lys	Gln	Arg	Asp	Ile	Val	Asp	Val	Thr	Arg	Thr	Val	
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Lys	Thr	Asn	Glu	Asp	Gly	Thr	Ile	Asp	Val	Thr	Val	Thr	Val	Lys	Pro	
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Lys	Gln	Ile	Asp	Glu	Gly	Ala	Asp	Val	Met	Ala	Leu	Leu	Asp	Val	Ser	
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Lys	Lys	Met	Thr	Asp	Ala	Asp	Phe	Asn	Asn	Ala	Lys	Asp	Lys	Ile	Lys	
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Lys	Leu	Val	Thr	Thr	Leu	Thr	Ser	Lys	Ser	Pro	Asp	Gly	Gln	Gln	Asn	
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Ser	Asp	Ser	Ile	Asp	Ile	Ser	Gly	Lys	Thr	Asp	Asp	Glu	Leu	Asp	Gly	
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		355					360					365				
Pro	Leu	Leu	Pro	Trp	Pro	Pro	Ile	Phe	Asn	Gln	Thr	His	Gln	Asn	Ala	
		370				375					380					
Asp	Met	Leu	Lys	Asp	Val	Asp	Phe	Leu	Ile	Ser	Leu	Ala	Gln	Lys	Leu	
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Gly	Met	Thr	Glu	Leu	Ser	Ser	Ile	Lys	Thr	Ile	Leu	Gln	Gly	Val	Gly	
				405					410					415		
Gln	Val	Ser	Gln	Phe	Gly	Gly	Phe	Leu	Leu	Gly	Gly	Gly	Ser	Leu	Thr	
			420					425					430			
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<210> 56

<211> 1091

<212> PRT

<213> Streptococcus dysgalactiae

<400> 56

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Glu	Glu	Asp	Gln	Gly	Ser	Gln	Ala	Glu	Ala	Leu	Glu	Glu	Pro	Thr	Pro	
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Ala	Pro	Gln	Thr	Ser	Pro	Ser	Thr	Val	Ser	Ala	Val	Pro	Ala	Glu	Ala	
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Ala	Ala	Met	Ala	Asp	Glu	Lys	Gly	Ile	Ala	Glu	Ala	Pro	Ala	His	Glu	
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Pro	Ala	Pro	Lys	Ala	Ser	Val	Gln	Ala	Glu	Ala	Ala	Ser	Pro	Ala	Gly	
			100					105						110		

Lys	Ala	Glu	Ala	Thr	Thr	Asn	Thr	Gly	Gln	Pro	Thr	Asn	Thr	Glu	Gln
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Lys	Asp	Gly	Glu	Lys	Asp	Lys	Gln	Leu	Ile	Lys	His	Arg	Asp	Gly	Asn
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Gln	Arg	Asp	Ile	Phe	Asp	Ile	Ser	Arg	Asp	Val	Lys	Val	Asn	Gln	Asp
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Trp	Pro	Phe	Tyr	Phe	Asp	Thr	Thr	Thr	Arg	Thr	His	Asn	Val	Val	Asn
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Lys	Phe	Asp	Lys	Tyr	Leu	Lys	Glu	Met	Ser	Glu	Ser	Gln	Lys	Phe	Phe	
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Lys	Val	Thr	Glu	Thr	Phe	Glu	Glu	Lys	Val	Ser	Val	Asn	Asn	Ser	Glu	
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Thr Gly Asp Thr Asn Lys Leu Glu Thr Phe Phe Thr Ile Thr Ala Leu  
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<210> 57

<211> 3276

<212> DNA

<213> Streptococcus dysgalactiae

<400> 57

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